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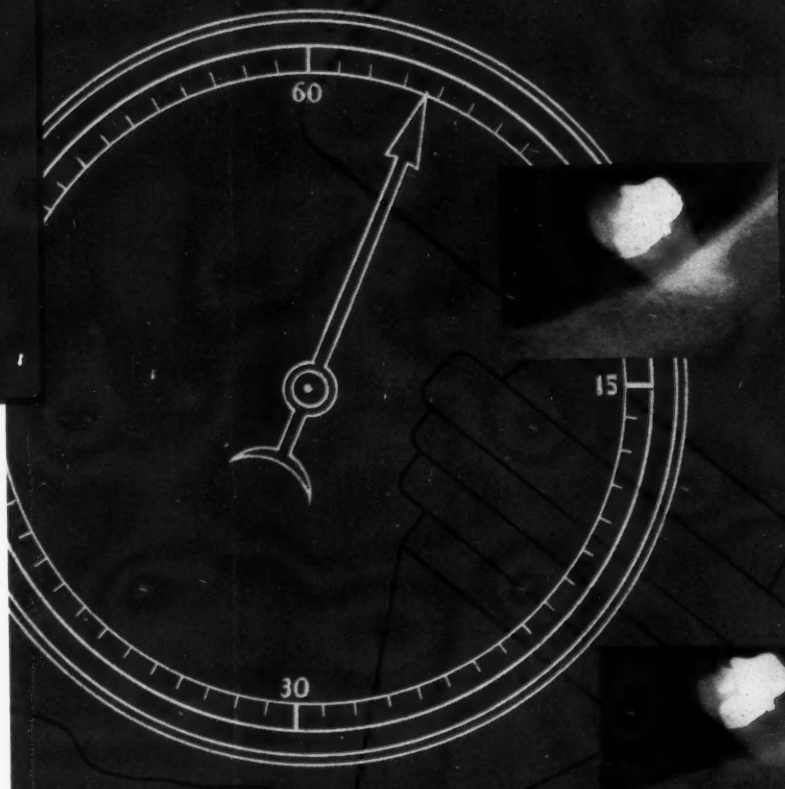
Dental Digest



October 1952

IN THIS ISSUE

travenous Nembutal in General Anesthesia for the Dental Office 432

teoarthritis-Diagnosis 437

mentary Tract Infections . 437

e Fundamentals of Successful Radiodontic Technique ... 438

ctured Anterior Teeth—Diagnosis, Treatment, and Prognosis 442

ntal Focal Infection 448

inical and Laboratory Suggestions 452

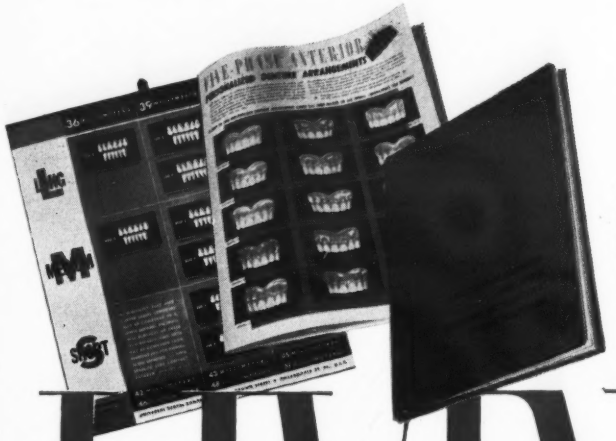
e Editor's Page 454

edicine and the Biologic Sciences 455

utra-Angles 463

Complete Table of Contents appears on page 431)

over illustration—Weinberger article page 438



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FIVE-PHASE ANTERIORS provide the widest variety of "living" labial surfaces—easy-to-select because they're all classified in the Five-Phase practical co-ordinate size system—identified by length-width measurements and by dominantly curved and flat labial characteristics.

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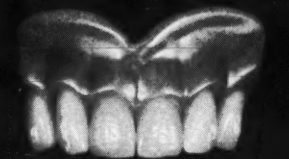
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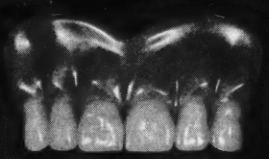
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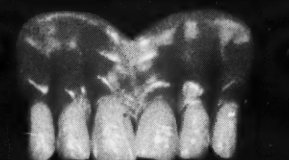
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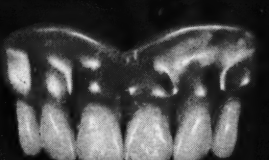
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A few transposed arrangements of teeth from different sets are shown to illustrate the remarkably lifelike individual dentures possible with Five-Phase Anteriors.

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FIVE-PHASE
ANTERIORS

Vol. 58, No. 10

Dental Digest

OCTOBER 1952

Registered in U.S. Patent Office

Intravenous Nembutal in General Anesthesia for the Dental Office
Phillip L. Chmar, D.D.S. 432

Osteoarthritis—Diagnosis (An Abstract) 437

Alimentary Tract Infections (An Abstract) 437

The Fundamentals of Successful Radiodontic Technique
Alexander Weinberger, D.D.S. 438

Fractured Anterior Teeth—Diagnosis, Treatment, and Prognosis
Anthony J. Malone, D.D.S., M.S. and Maury Massler, D.D.S., M.S. 442

Dental Focal Infection—Part One
Louis I. Grossman, D.D.S. 448

Clinical and Laboratory Suggestions 452
1. Trimming Plaster Models. 2. Anatomic Cigar Holder for Denture Wearers. 3. An Aid in Cementing Inlays and Crowns. 4. An Aid in the Acrylic Brush Technique. 5. A Quick Denture Repair. 6. Cementing a Porcelain Jacket Crown.

The Editor's Page 454

Contra-Angles 463

Medicine and the Biologic Sciences 455

About Our CONTRIBUTORS

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INTRAVENOUS NEMBUTAL®

in General Anesthesia for the Dental Office

PHILLIP L. CHMAR, D.D.S.

Baltimore, Md.

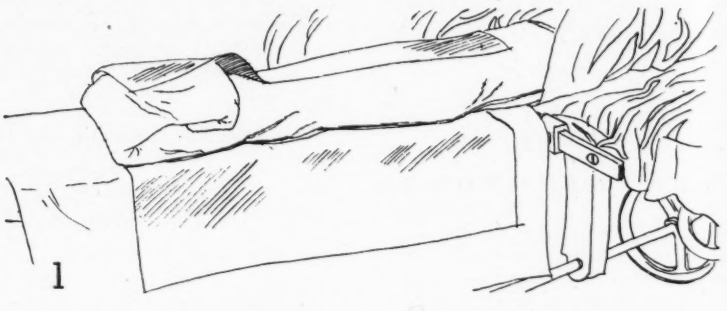
DIGEST

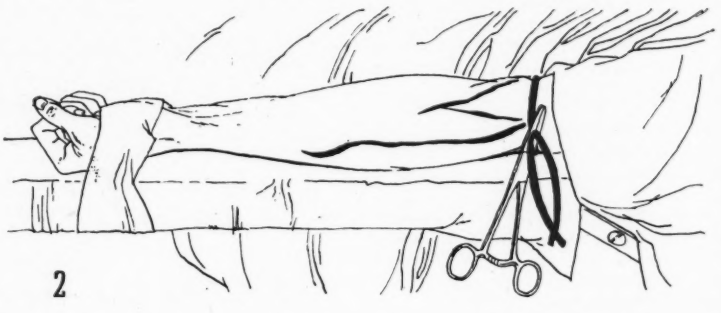
One of the dangers inherent in nitrous oxide-oxygen anesthesia in the dental office is the anoxemia which results from the low oxygen content of the gaseous mixture used to obtain the proper degree of anesthesia.

Some techniques suggest that at the beginning of anesthetization the gaseous mixture should be 90 to 94 per cent nitrous oxide and 6 to 10 per cent oxygen. This mixture does not contain enough oxygen to sustain life and results in varying degrees of anoxemia. If induction is prolonged or a low oxygen content maintained, irreparable brain damage may result.

This article presents a simple procedure for general anesthesia with nitrous oxide-oxygen. The technique described employs sodium pentobarbital as an adjunct to nitrous oxide-oxygen anesthesia with added vinethene. The gaseous mixture contains sufficient oxygen to eliminate almost entirely the possibility of anoxemia. Also, because sodium pentobarbital is not irritating to the larynx, the possibility of laryngospasm is reduced to a minimum.

The illustrations for the article were furnished through the courtesy of Abbott Laboratories.





1. ***Method of applying moist heat to dilate poorly filled veins. The arm is wrapped with a Turkish towel wrung out of hot water, over which is placed a rubber sheet which, in turn, is enclosed by a dry Turkish towel. This is left in place for ten to twenty minutes.***

2. ***Tourniquet has been tightened and patient has been instructed to make a fist.***

3. ***Veins in the antecubital space were outlined before tourniquet was tightened.***

Sodium Pentobarbital— *Description*

A sodium derivative of 5-ethyl-5 (1 methyl butyl) barbituric acid, sodium pentobarbital occurs as a white granular crystal or powder. It is odorless and slightly bitter to taste. It is highly soluble in water, freely soluble in alcohol, and insoluble in ether. The seat of depression from sodium pentobarbital is believed to be in the subcortical regions.

Incompatibilities—(1) The aqueous solution decomposes on standing. (2) When boiled, ammonia is given off and a precipitate is formed. (3) Solutions of sodium pentobarbital, when mixed with acids, produce a precipitate.

Uses—Extremely rapid acting hypnotic with a low toxicity, pentobarbital is almost completely destroyed in the body, principally in the liver, and should be used with caution in patients exhibiting impaired liver function or impaired renal elimination.

The agent is useful in the following situations:

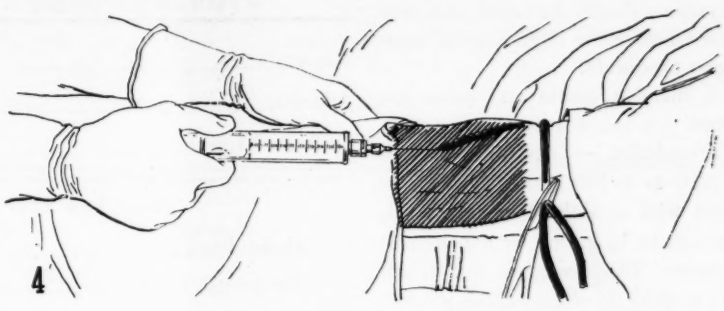
(1) Simple insomnia
(2) As a sedative in epilepsy
(3) In chronic neurosis
(4) Hysteria
(5) As an agent to augment the action of analgesics
(6) Preanesthetic sedative for local anesthesia
(7) In the treatment of cocaine and strychnine poisoning
(8) As an anticonvulsive agent

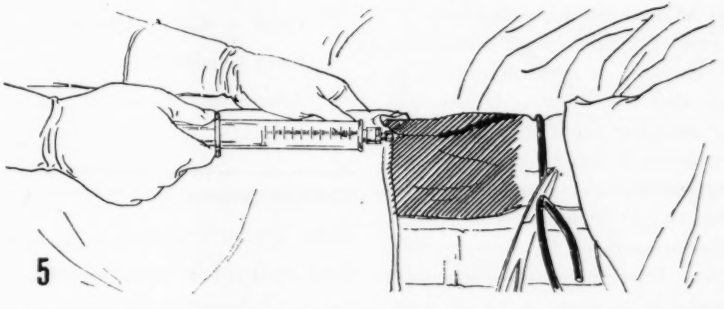
Dosage—(1) As an hypnotic, 1½ grains. (2) As an anticonvulsant, 5 to 8 grains intravenously. (3) As a preanesthetic agent, by mouth 1½ to 3 grains; intravenously, 100 to 250 milligrams.

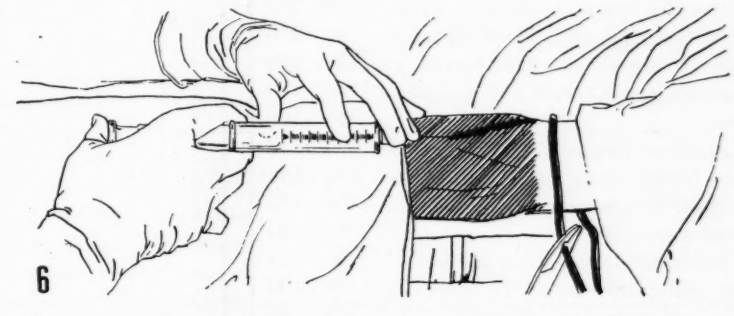
Contraindications—Intravenous sodium pentobarbital should not be used unless it is certain that a patent airway can be maintained throughout the period of anesthesia. This is a general precaution for all anesthetic agents, but it cannot be overemphasized.

The anesthetic should not be used in the presence of the following conditions:

(1) Dyspnea
(2) Marked cardiac disease with decompensation
(3) Low hemoglobin per cent
(4) Limitation of respiratory movements
(5) A full stomach







4. ***Venipuncture at antecubital fossa. Arm has been prepared with antiseptic solution, draped and tourniquet tightened. Needle is aimed parallel to long axis of vein.***

5. ***Note thumb of left hand tensing skin back of needle, and position of the right hand and thumb against barrel of syringe to permit slight aspiration during venipuncture.***

6. ***Method of holding the syringe with the needle inserted into median cephalic vein.***

Procedure for Administration

Preliminary Steps—1. The patient is instructed not to eat or drink for six hours before his scheduled appointment and to bring someone with him to accompany him home.

2. On the patient's arrival in the office he is seated in the dental chair and the card (on page 434) is filled out:

3. If the patient gives a history of any systemic condition, or if he is

under the care of a physician, the physician should be called and consulted before the beginning of anesthetic procedure.

4. Blood pressure and pulse are taken.

Presedation — Atropine sulfate (1/200 to 1/150 grain) is administered, with or without morphine sulfate (⅛ to ¼ grain) by hypodermic injection. This dosage is for an adult; a child should be given proportionately less atropine and no morphine. Scopolamine (1/200 to 1/100) may be used instead of atropine.

Sodium Pentobarbital Administered—One-half or three-quarters of an hour after the injection of morphine and atropine or of atropine alone, the patient is recalled and instructed to go to the rest room. Tight garments should be loosened to prevent undue pressure on the chest.

Slow Injection: After the patient is seated in the chair, 50 to 250 milligrams of sodium pentobarbital (nembutal) solution containing 50 milligrams per cubic centimeter is injected intravenously. About ¼ to ½ cubic centimeter is administered at intervals over a period of 3 to 5 minutes.

Injection Stopped: When the patient begins to see double or reaches a state of amnesia, the needle is withdrawn.

Maximum Dosage: No more than 250 milligrams should be given in any one injection. Extreme care should be used in children under fourteen years of age in giving nembutal intravenously.

Procedure Completed—1. After the injection of sodium pentobarbital the restraining straps are applied, the nosepiece from the gas machine is placed in position, and tightened.

2. A mouth prop is placed in position, and the machine is adjusted for a flow of 80 per cent nitrous oxide and 20 per cent oxygen at 5-millimeter pressure.

3. The mouth is then covered and the patient is instructed to breathe deeply. After the first few inhalations a small amount of vinethene is added to the mixture.

4. Within three to five minutes the average patient will reach the second plane of the third stage of anesthesia. A gas mixture of 75 to 80 per cent nitrous oxide and 20 to 25 per cent oxygen is then used for maintenance, provided the throat pack is placed properly.

5. The vinethene may be turned off and on during the surgical procedure as needed. It should not be used continuously for a greater length of time than one half hour.

ANESTHESIA CHART

Name: _____

Address: _____ Phone: _____

Doctor's Name: _____ Phone: _____

Have You Ever Had the Following:

Heart Disease: _____

Rheumatic Fever: _____

Hypertension: _____

Diabetes: _____

Liver or Kidney Disease: _____

Lung Conditions: _____

Allergy or Asthma: _____

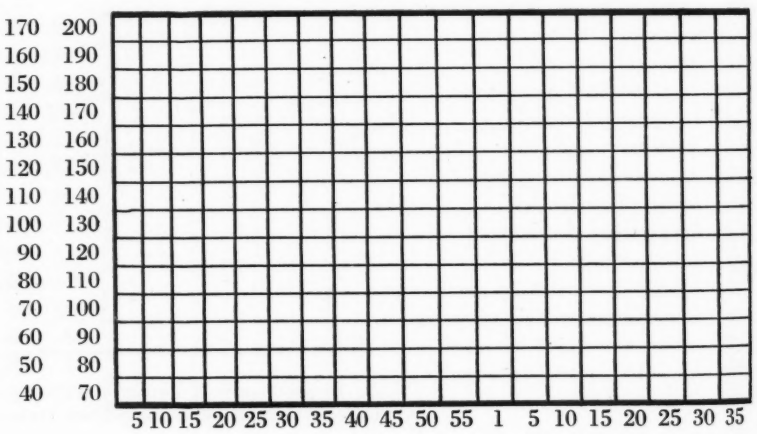
Anemia: _____

Had Gas Before: _____

Under Doctor's Care: _____

Food or Drink in last 4 Hours: _____

Menstrual Period or Menopause: _____



Case Histories

Case One—The patient, a woman aged 28, weighing 125 pounds, with a blood pressure of 120/74, was anesthetized for the extraction of eleven teeth. The history was negative for systemic disease. The patient had taken nitrous oxide previously in obstetrical procedure.

Premedication — Morphine was given, 1/6 grain. Atropine 1/200 grain.

Anesthetic Administered—Initially, 100 milligrams of nembutal was administered intravenously in small doses at intervals, over a period of three to five minutes. The patient became extremely drowsy, relaxed, and reached a state of amnesia. Anesthesia was then begun with nitrous oxide, 80 per cent, and oxygen 20 per cent. Small amounts of vinethene were added.

Reaction Favorable—The patient took the anesthetic willingly; no evidence of disturbance was noted in the excitement stage. The second plane of the third stage of anesthesia was reached in a few minutes.

Maintenance Smooth—Anesthesia was maintained smoothly and steadily throughout the operation with 80 per cent nitrous oxide, and 20 per cent oxygen. Small amounts of vinethene were added at intervals.

Consciousness Regained Rapidly—When anesthesia was discontinued, consciousness returned in two minutes but the patient was extremely drowsy. After fifteen minutes of rest she was able to walk out of the office. The patient reported that she slept intermittently for three or four hours following anesthesia and that she slept soundly that night.

Case Two

A male patient, twenty-three years of age, weighing 140 pounds and whose blood pressure was 110/84, was anesthetized for the extraction of 10 teeth. There was no history of systemic disease. Two years previously the patient had been given nitrous oxide.

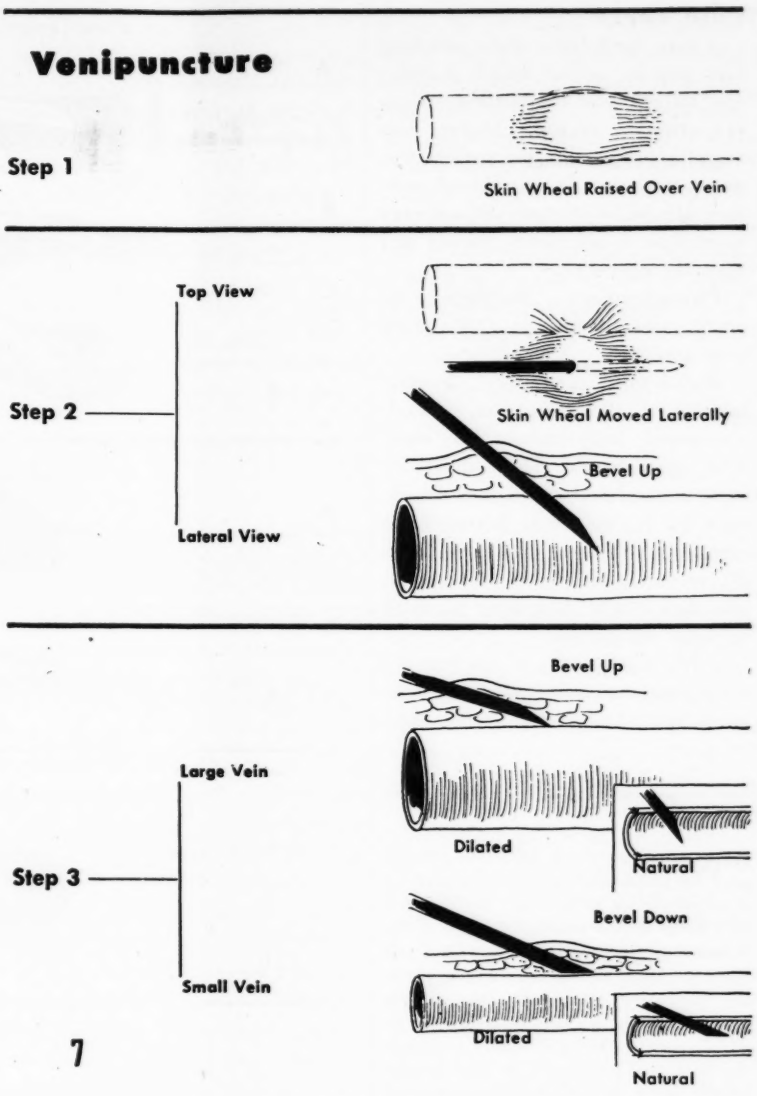
Premedication — Morphine, 1/6 grain and atropine 1/200 grain, were given.

Anesthesia—1. Two hundred milligrams of nembutal were administered intravenously in small doses at intervals. The patient became relaxed, drowsy, and was in a state of amnesia when injection was completed. Nitrous oxide, 80 per cent, and oxygen, 20 per cent were started. An extremely small amount of vinethene was then added to the gaseous mixture.

2. The patient passed rapidly through the excitement stage without noticeable stress. The second plane of the third stage was reached in a few minutes. At that time the mixture was changed to 75 per cent nitrous oxide and 25 per cent oxygen.

3. Anesthesia was maintained evenly until surgery was completed.

After-effects Favorable—The patient roused two or three minutes after the anesthestic mixture was withdrawn in a state of light stupor which rapidly disappeared; in twenty minutes he was able to leave the office. He slept intermittently the remainder of the evening and soundly during the night.



7. ***Venipuncture. Step 1, position of the skin wheal raised directly over the vein. Step 2, the skin wheal is moved to one side of the vein and the needle is thrust through the wheal into the subcutaneous tissue lateral to the vein. The point of the needle and the wheal are then moved to the previous position over the vein and the venipuncture is made. Step 3, the bevel of the needle is directed upward for venipuncture when the vein is large, but where the vein is small venipuncture is facilitated by insertion of the needle with the bevel down. (From Proceedings Staff Meetings, Mayo Clinic, 12:122-125, 1937.)***

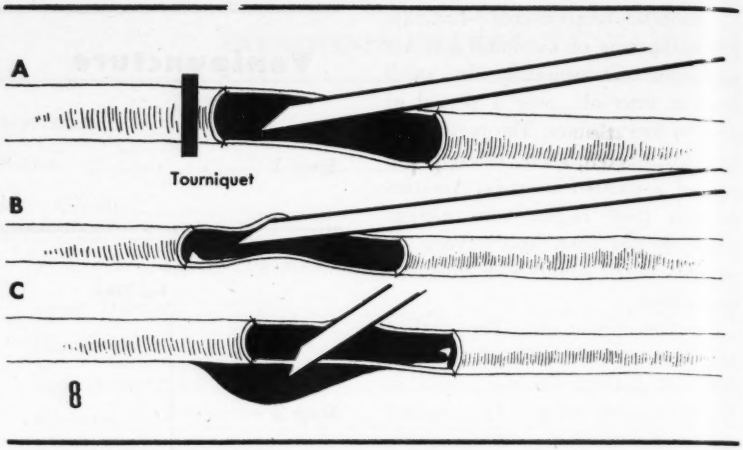
Case Three

A man, aged thirty years, weighing 150 pounds, whose blood pressure was 130/90, was anesthetized for the extraction of 12 teeth. History was negative except that the patient was under treatment for low blood pressure. His blood pressure did not vary more than 5 millimeters during and after the operation.

Premedication — Morphine, ¼ grain, and atropine, 1/150 grain were given.

Anesthetic Procedure—1. Nembutal sodium, 125 milligrams, was administered intravenously in small doses at intervals. The patient became relaxed and stated that the objects in the room were beginning to turn. Administration of nitrous oxide, 80 per cent, and oxygen, 20 per cent, was then begun. Vinethene in small amounts was added.

2. When the patient reached the second stage of anesthesia he became rigid. Nitrous oxide was increased to



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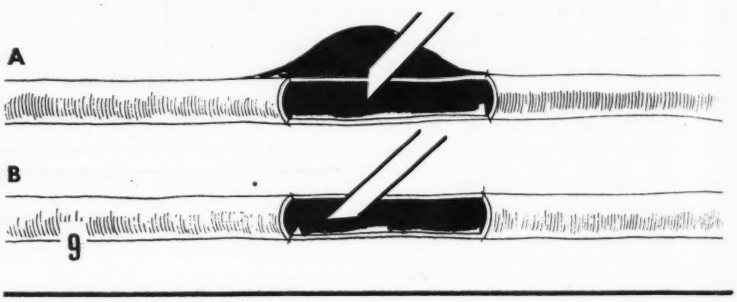

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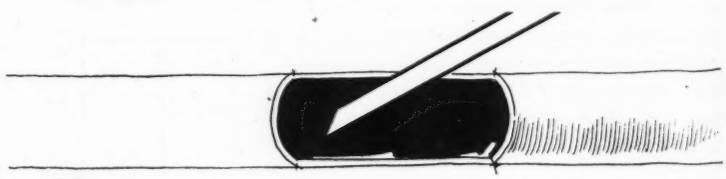

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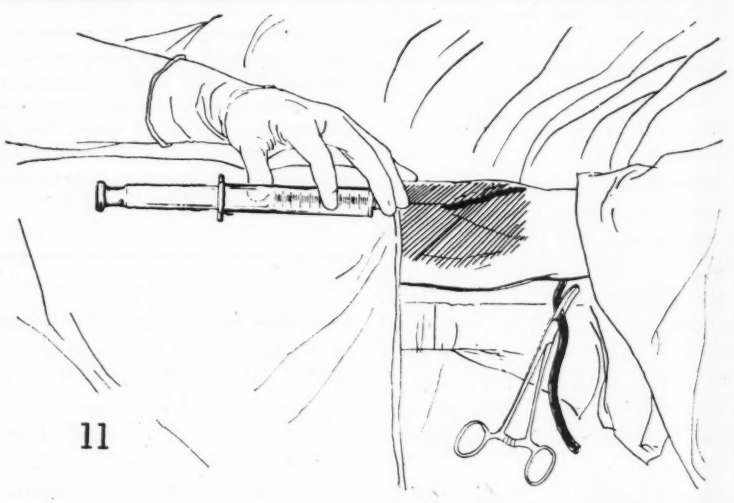

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8. ***Venipuncture: A, with the tourniquet in place and the vein dilated, a relatively large needle may be inserted into what was a relatively small vein; B, when the tourniquet is released and the vein tends to collapse and occlude the lumen of the needle, the needle may function unsatisfactorily, if at all; C, without the tourniquet to dilate the vein, readjustment of the needle blindly often results in perforation of the wall of the vein and the subsequent formation of a hematoma. (From Surgery, 2:590, 1937.)***

9. ***Venipuncture: A, when a large needle is to be introduced into a relatively small vein, a hematoma may form if the bevel of the needle is turned up; B, however, when the patient has been carefully prepared, a relatively large needle may be introduced into a relatively small vein if the bevel is turned down. (From Surgery, 2:590, 1937.)***

10. ***Venipuncture. Satisfactory relation of lumen of the needle to lumen of the vein, regardless of whether the bevel is turned up or down. (From Surgery, 2:590, 1937.)***

11. ***Technique of maintaining the syringe with needle in vein at antecubital fossa.***

90 per cent and oxygen was reduced to 10 per cent for one minute. As he relaxed, the mixture was changed to nitrous oxide, 80 per cent, and oxygen, 20 per cent. This percentage was maintained until surgery was completed.

Postanesthetic Effects Satisfactory—The patient became conscious within two minutes after the anesthetic was withdrawn. He was in a state of drowsiness. After resting ten minutes he was able to leave the office with his companion.

Conclusion

Although the technique described is not the complete answer it is a step toward the elimination of some of the dangers of general anesthesia in the dental office. If followed with care, this procedure will produce a more even and a smoother anesthesia and will reduce the hazard of anoxemia.

Before attempting the use of intravenous nembutal in general anesthesia, the operator must be familiar with its indications and contraindications; its advantages and disadvantages. The agent should not be used indiscriminately. Nembutal, like any other barbiturate, is a respiratory depressant and only one who is well trained in general anesthesia should attempt to use it.

It must also be emphasized that in this technique intravenous nembutal is being used as an adjunct to a gaseous general anesthetic and not as the anesthetic itself.

44 *Edgewater Apartments.*

Osteoarthritis—Diagnosis

The most common form of arthritis in patients over 60 is degenerative joint disease or osteoarthritis. This is so because of the almost universal occurrence of joint stiffness and degenerative changes in these patients.

Most joint changes are mainly attributable to wear and tear. Trauma, postural deformities, and other conditions aggravate the changes in the joints. Also there is considerable evidence that hormonal factors, such as menopause, and hereditary influences predispose some persons to this condition early in life.

An insidious onset characterizes the clinical picture. The following symptoms are present: (1) aching after prolonged exercise, and (2) marked stiffness after periods of immobility (articular jelling) with rapid "limbering up" on resumption of activity and absence of joint swelling or deformity. Usually the patient is overweight but otherwise well. He is more alarmed by the symptoms than by actually suffering.

Physical examination reveals a palpable lipping of the bony margin of the involved joint. Motion produces crepitation of the joints. Enlargement of the joints, if present, is hard or "bony." Muscle strength of the part is well preserved. The involvement in the hands is usually first in the terminal joints (Heberden's nodes) and then in some proximal interphalangeal joints (Bouchard's nodes). This produces a somewhat painful and limited motion, but rarely a marked deformity.

The x-ray picture for osteoarthritis is characteristic. There are no diagnostic laboratory studies for the disease. Hypertrophic changes about the involved joints, with the formation of spurs or osteophytes at the articular margins, and sclerosis or condensation (eburnation) of subchondral bone are nearly always visible in the films. When the spine is involved, peripheral neuralgia may result from irritation of a nerve root as it passes through a foramen partly obstructed by osteophyte formation. Except in the case of hip involvement, there is little deformity or disability. Although the clinical picture is suggestive, degenerative disease is usually diagnosed by x-ray findings.

Adapted from *Medical Clinics of North America* **35**:1749-1763 (Nov.) 1952.

Alimentary Tract Infections

INFECTIONS along the alimentary tract are successfully treated with medicinal zinc peroxide, for example, ulcerative stomatitis and Vincent's infection of the mouth and gums. Often pain of sore throat produced by the hemolytic Streptococcus is promptly relieved by the use of medicinal zinc peroxide. This may be applied to the surface as a mouthwash or gargle, or, in order to maintain contact with the infection for as long a time as possible, it is a good practice to make a thick suspension of medicinal zinc peroxide on a flat piece of wet cotton and apply it directly to the lesion, maintaining contact for an hour at a time several times a day. The tonsils and pharynx may be swabbed with cotton on an applicator wet with the zinc peroxide suspension. Medicinal zinc peroxide may be used as a prophylactic before plastic operations on the mouth or before dental extractions. After extractions it may be applied on a small pledget of cotton directly into the tooth socket.

If infections occur from the mouth organisms spreading down into the neck with a rapid breakdown of the nodes and surrounding tissues, after incision for drainage, medicinal zinc peroxide may be applied to the abscess cavity, with a rapid resolution of the infection. The foul odor of these infections is due to gas-forming anaerobic streptococci with or without spirochetes. When their growth and activity is prevented by treatment with medicinal zinc peroxide, the odor rapidly disappears.

From *Journal of the American Medical Association* **149**:1452 (Aug. 16) 1952.

The Fundamentals of Successful RADIODONTIC TECHNIQUE

ALEXANDER WEINBERGER, D.D.S., Philadelphia

DIGEST

The production of radiographs of suitable quality, essential for proper interpretation and diagnosis, is dependent upon proper technique at the chair and in the processing room. The emphasis that has been placed on target film and object film distance, which is more elaborate than practical, would seem to have revived interest in the extension cone technique. Many articles published recently have convinced dentists that the addition of this extension is sufficient to improve results.

It matters little to the final radiograph, however, whether an eight, sixteen, twenty, or twenty-four-inch target film distance is used if (1) film placement is not correct, and (2) processing not completed under favorable conditions. This article presents the basic rules, drawn from the author's own experience, to be followed to produce successful films.

Importance of Flat Film Plane

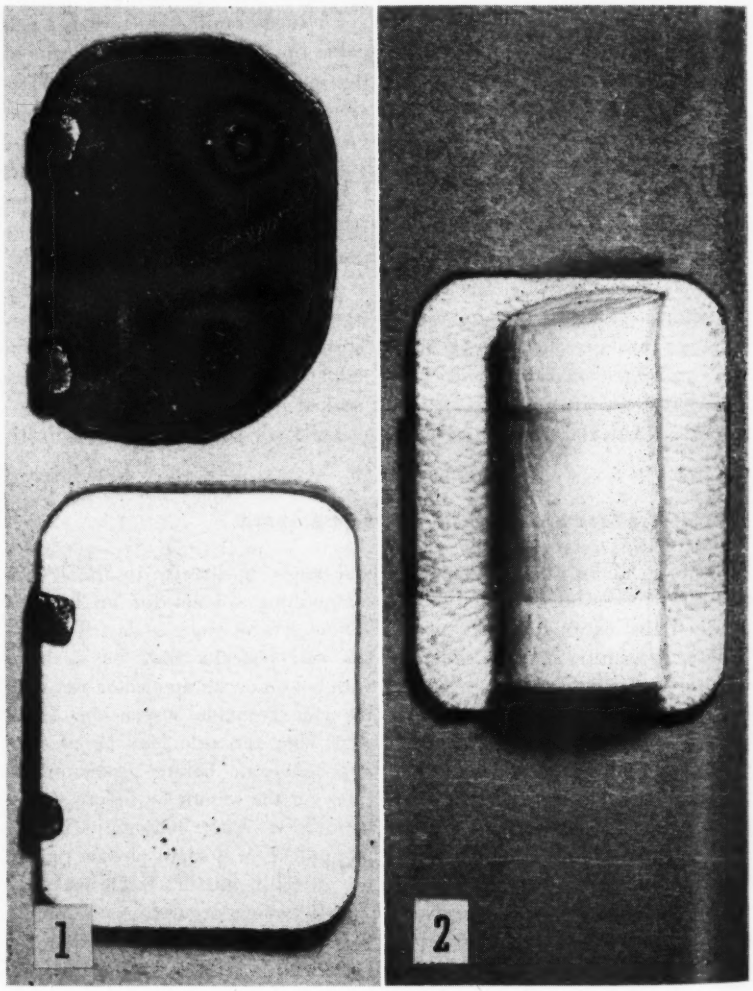
An important requisite in the production of satisfactory radiographs is the maintenance of a flat film plane. This is best accomplished by the use of a film stiffener as illustrated in Figure 1. A film stiffener can readily be made from an old aluminum impression tray.

First Method—The plate is placed behind the film and not only maintains a flat film plane but also acts to prevent secondary radiation from striking the film.

Second Method—A second method is the use of cotton rolls, preferably the starched type (Fig. 2). Figure 3 is that of a lower cuspid projection showing distortion because of a curved film plane, and a film of the same area showing the exactness produced when using either of the methods suggested.

Correct Horizontal Angulation

Correct horizontal angulation, utilizing central radiation, is best checked by using a diaphragm. Normally, an exposure area of 4¼ in-



1. *Film stiffener.*

2. *Cotton roll attached to film as stiffener.*

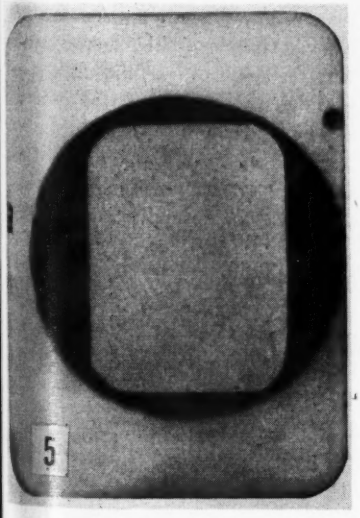
ches in diameter is provided which more than covers the standard size film. Figure 4 shows the area of exposure as compared to the film. The area of latitude available without producing cone cutting is readily seen. By the use of a diaphragm the area of exposure is reduced as illustrated in Figure 5.

Diaphragm Easily Made—1. A piece of sheet lead, such as plumbers use, is cut to fit the inside of the plastic pointer. 2. A hole is cut in the center 1¼ inches in diameter. 3. The diaphragm is placed inside the pointer and the latter replaced on the x-ray machine (Figs. 6 and 7).

To Secure Sharp Detail—If cone cutting occurs (1) radiation is not centered, or (2) the horizontal angulation is incorrect. The author's experience is that correct horizontal angulation is the key to sharp detail.

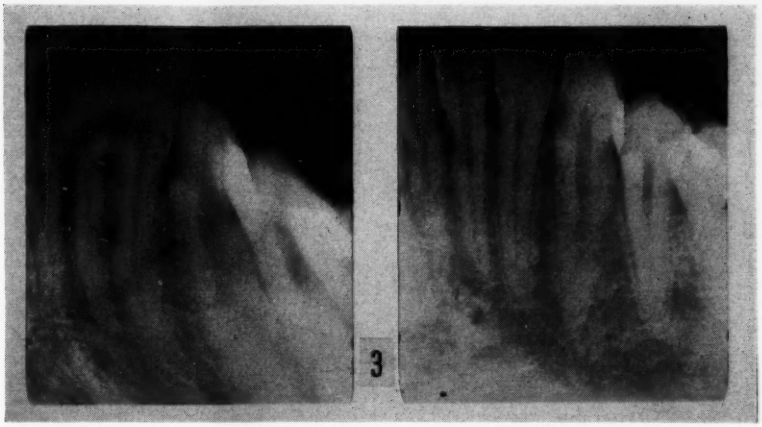
Proper Density

Density is a difficult problem because no standard has been set. The degree of density, however, depends on the method of viewing the films. All films should be examined by the light of a view box rather than by natural or ceiling light. View boxes all have different degrees of illumination; therefore, a standard density must be established for each one. Figure 8 is a series of exposures of two, three, four, and five seconds each, other factors being equal.

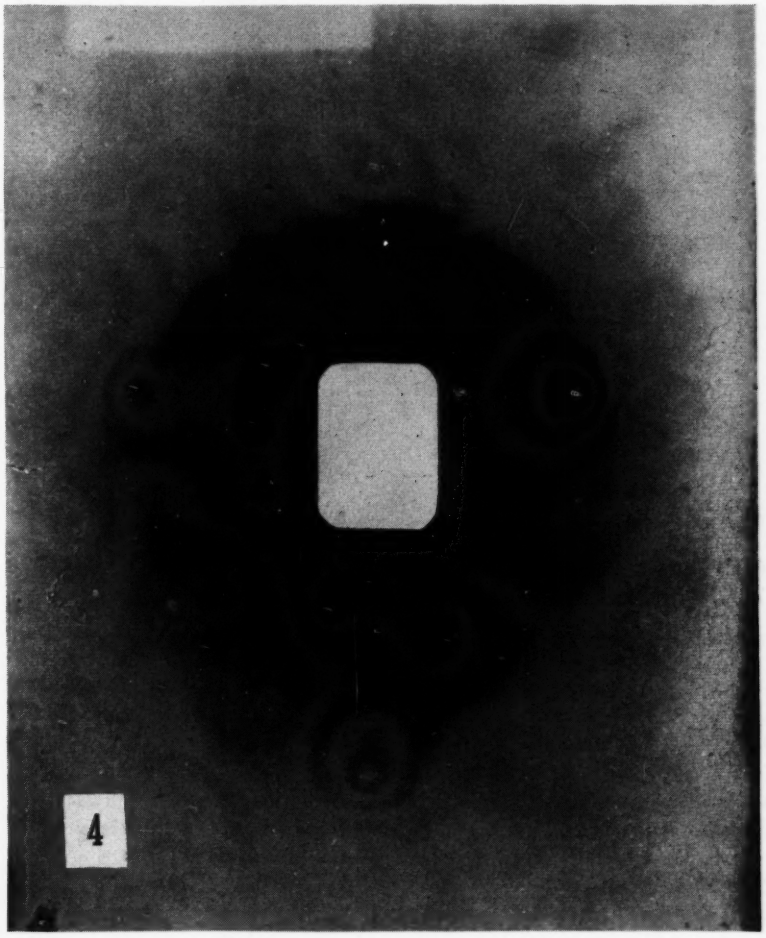


5. ***Reduction of exposure area compared to standard film.***

Rules to Establish Density—Two rules are observed to establish correct density: 1. That part of the film free of bone and tooth structure



3. ***Distortion because of curved film and the same area showing detail registered on flat film plane.***



4. ***Area of radiation without diaphragm compared to standard film.***

6. ***Lead diaphragm.***
7. ***Lead diaphragm in position on plastic pointer.***

should be just black enough to hide a view of the finger when it is placed between the film and the view box. 2. In edentulous areas the soft tissue should be visible although the film is dark in the area of rule one.

Underdeveloped Film—A light film is one that is either underdeveloped or underexposed. An underdeveloped film has detail but all the shades are light, no black existing even in the parts free of tooth and bone tissue.

Underexposed Film—An underexposed film is black in those parts usually black but detail is lacking and the bone and teeth have a chalky appearance. Figure 9 shows a film with excellent density, an underdeveloped film, and an underexposed film.

Method for Correcting Dark Film

A film that is too dark can be lightened chemically. For this purpose two solutions are used as follows:

1. A solution of potassium ferricyanide, one ounce to a pint of water, is stocked and marked A.

2. A second solution, B, is stocked which contains one ounce of hypo crystals to sixteen ounces of water.

3. When to be used a mixture of one part of A to three parts of B is placed in a paper drinking cup.

4. The film to be reduced should have been previously fixed but not necessarily washed. The dark film is placed in this mixture for ten seconds, removed, rinsed in water and viewed at the view box.

5. If still too dark the process is repeated until the correct density is achieved.

6. After reduction the film should be washed in the routine manner. The mixture can be used until it turns a green color. This takes place in about thirty minutes.

7. If it is necessary to reduce a film after it has been processed and dried, the film should be wet thoroughly by placing in the wash bath before reduction; otherwise, uneven reduction will result. Figure 10 shows a dark film and the same film reduced to proper density.

The Safe Light

A dark room should be free of white light. The safe light should be a minimum of thirty-six inches from the loading table. A Wratten 6B amber filter and a bulb having a maximum wattage of ten is standard. Although commonly used, red is contraindicated for x-ray film processing.

Time Factor Varies—A safe light is only relatively safe; films should therefore remain under it no longer than required to mount on the processing frames. This factor varies with the speed of the film, ultra speed film being more sensitive than the slower speeds.

Cause of Fogged Films—A poor safe light or prolonged exposure to a safe light can result in fogged films.

Solution

Processing solutions should be prepared from packaged chemicals or purchased already prepared. In the author's experience, solutions purchased as concentrates and then diluted for use have not given long-lasting results. When freshly prepared they function well but deterioration is rapid. For warm weather processing, fixer made from con-

centrates is contraindicated. Issue may be taken with this statement but experience would seem to be the most reliable proof. Innumerable problems of consistently poor films have been eliminated by following the suggestions given concerning solutions.

Prepared Solutions Preferred—If a series of test films were run over a period of time it would be found on constructing a graph that the deterioration curve for concentrates would be sharp, whereas that for the prepared solutions would be gradual.

Quantity of Solution a Factor—One gallon tanks or larger produce satisfactory films over a longer period of time than tanks of smaller size.

Final Suggestions

1. Films should be rinsed a minimum of one minute before placing in the fixer bath. This will preserve the life of the fixer and result in rapid clearing of the films.

2. A film is cleared when all emulsion not activated by radiation and chemically reduced has been removed by the hypo of the fixer.

3. The film can be viewed for interpretation but it must be replaced in the bath for a period equal to twice the clearing time.

4. When the clearing time exceeds twice the normal time the bath should be changed or reactivated. Restoring the normal acid content of the bath with acetic acid will suffice. Any photographic supply house can provide preparations for this purpose.

Summary

The following fundamental information concerning successful radiodontic technique has been presented:

1. A flat film plane is essential for detail in all techniques whether the film distance be long or short target.

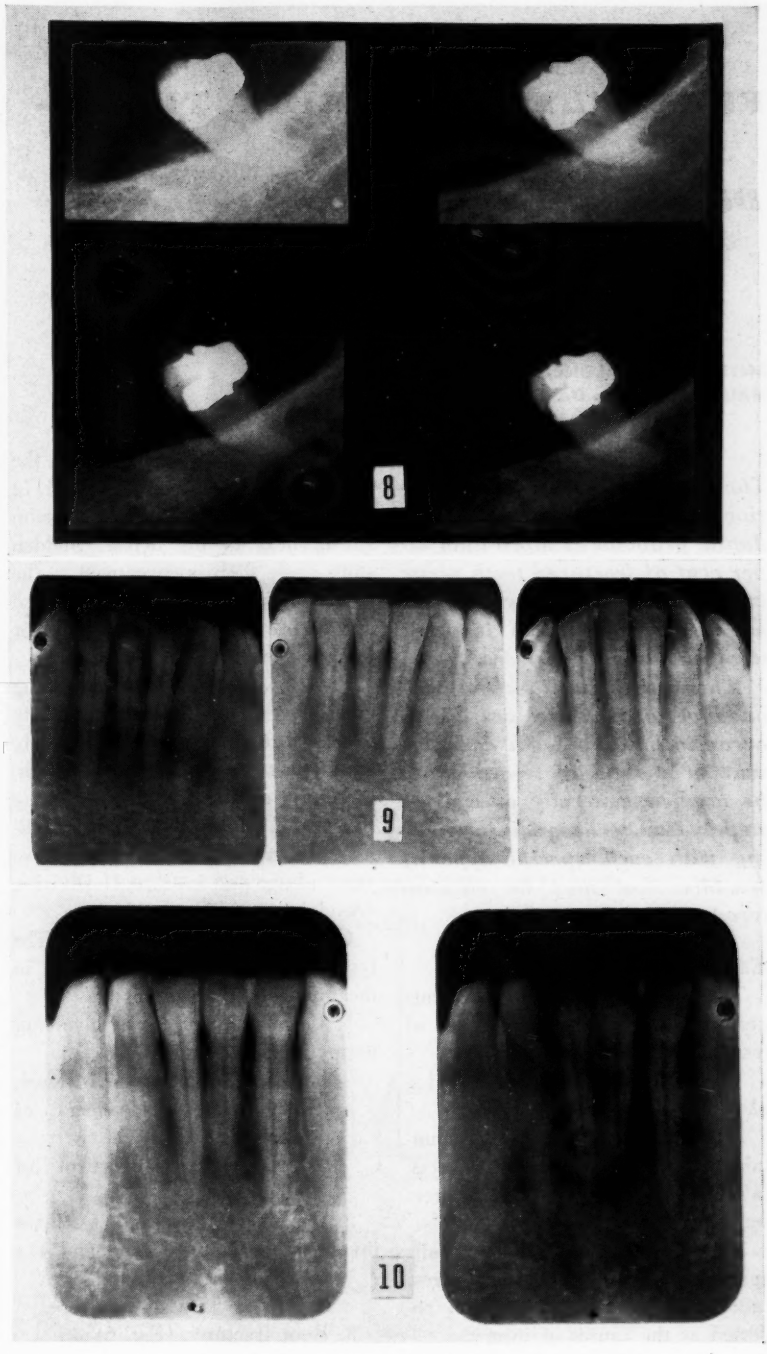
2. There is no substitute for correct horizontal angulation.

3. Incorrect vertical angulation will result in either elongation or foreshortening of the image; but poor horizontal angulation will produce radiographs lacking in detail.

4. Suggestions have been given for the maintenance of a flat film plane and a means of determining correct horizontal projection.

5. Dull, lifeless films are problems that can only be eliminated by attention to fundamentals of processing which include proper safe light, selections of solutions, and attention to the final details of processing.

915 *Medical Arts Building.*



8. *Exposures of 2, 3, 4, and 5 seconds, each showing various densities.*
9. *Normal density, underdeveloped, and underexposed film.*
10. *A dark film and the same film after reduction.*

FRACTURED ANTERIOR TEETH—

*Diagnosis, Treatment, and Prognosis**

ANTHONY J. MALONE, D.D.S., M.S. and MAURY MASSLER, D.D.S., M.S., Chicago

DIGEST

The treatment of fractured anterior teeth is peculiarly a pedodontic problem as more than 80 per cent of fractured teeth occur in children. Maxillary incisors are much more often involved than mandibular incisors.[1,2]

This article classifies the various types of fractures possible to occur in anterior teeth and presents a method of treatment to be applied generally as well as step-by-step techniques for dealing with each specific type of fracture that may be encountered.

Etiology

The following types of accidents are the most frequent cause of trauma to the anterior teeth:

1. Accidents occurring during play.

2. Accidents at drinking fountains, injuries from thrown objects, falls from stairs or on concrete walks, and bicycle falls.

3. Accidents in the home. Falls against corners of cooking ranges, radiators, and tables are often reported as the causes of injury.

4. Automobile accidents. Most children like to sit next to the driver and imitate him by actively identifying themselves as the actual operator of the car. The National Safety Council of America has reported that the person most frequently injured in automobile accidents is the person sitting next to the driver. Sudden stops cause the passenger next to the driver to strike against the dashboard and to fracture the anterior teeth or to knock them out.

Predisposing Factors—Protruding anterior teeth are much more likely to be injured than are retruded teeth. Accidents to the upper anterior teeth, therefore, are more common during the period of physiologic premaxillary protrusion from seven to twelve years of age and in Class II Division (Angle) cases of malocclusion.

Classification of Injuries—The types of injuries may be placed in the four following groups:

1. Coronal fractures not involving the pulp (Figs. 1 and 2):
   (a) Simple fracture of enamel.
   (b) Moderate involvement of dentin.
   (c) Extensive involvement of dentin.
2. Coronal trauma and fractures involving the pulp (Figs. 3 and 4):
   (a) Pin-point exposure.
   (b) Large area of exposure.
3. Root fractures (Fig. 6):
   (a) Apical third of the root.
   (b) Middle third of the root.
   (c) Cervical third of the root.
4. Displaced teeth:
   (a) Partial displacement (extrusion or intrusion).
   (b) Total displacement.

General Plan of Treatment

The sooner the traumatized tooth can be treated after the accident the more hopeful the prognosis. Most delays are due to procrastination by the dentist who is uncertain how to proceed and solves his problem by saying, "Come in next week and we'll see how the tooth gets along."

A well-planned routine will eliminate hesitancy and save many teeth. The following routine is suggested:

History—The following information should be obtained:

1. Name, address, and telephone number.
2. Age.
3. When the accident occurred.
4. How the accident occurred.
5. Where the accident occurred.
6. History of previous accidents.

Subjective Complaint—It should be determined whether the tooth is sore to touch, pain on biting, reaction to heat or cold.

Clinical Examination—Investigation of the following points should be completed:

1. Type of injury (coronal fracture, pulp exposure, displacement of tooth, loss of tooth, laceration of tissues, or swelling).

2. Reaction to percussion.

3. Transillumination examination for the following conditions: (a) vascular congestion, (b) cracks in the enamel, (c) bleeding in pulpal tissues, (d) periapical fractures, (e) gingival engorgement, and (f) alveolar bone fractures.

Roentgenographic Examination—The dentist is legally responsible to obtain roentgenograms as an aid in the judgment of an injury. A roentgenogram of *all* anterior teeth is taken as soon as possible after the accident to determine the following:

1. Size of the pulp and its relation

*This article originated in the Division of Graduate Pedodontics, University of Illinois, College of Dentistry. The drawings used to illustrate the article are by Thomas K. Barber, D.D.S., M.S.

[1]Sweet, C. A.: Fractured Anterior Permanent Teeth, J.A.D.A. **29**:97 (Jan.) 1942.

[2]Ellis, R. G.: The Classification and Treatment of Injuries to the Teeth of Children, ed. 2, Chicago, Year Book Publishing Company, 1946.

to the line of fracture.

2. Stage of development of the root apex.

3. Presence of a root fracture.

4. Possible injury to adjacent teeth.

5. Comparison with future roentgenograms.

General Treatment

Although the plan of treatment for each fractured tooth is an individual procedure, the pulp requires primary and immediate treatment after the accident. In the author's practice *every traumatized tooth* is covered with a sedative paste of zinc oxide and eugenol within a celluloid crown form (Fig. 1).

No Injury Should be Regarded Lightly—Any injury to the teeth, *no matter how slight*, should receive serious consideration. Teeth with a slight fracture of the enamel are often dismissed too quickly with no further treatment than disking or grinding. However, so-called slight accidents may cause more severe pulp damage than an extensive coronal fracture.

Pulp Sedative Advised—It is therefore important that all fractured teeth should be treated at once with an obtundant paste and a protective cover to sedate the pulp and permit it to recover from the shock of the trauma.

Treatment of Coronal Fractures not Involving Pulp

All varieties of coronal fractures are included in this group from simple fracture of the enamel to extensive involvement of the dentin (Fig. 1). However, in these cases the pulp is *not* affected.

Emergency Treatment—The following measures should be taken immediately:

(1) Record the case history.

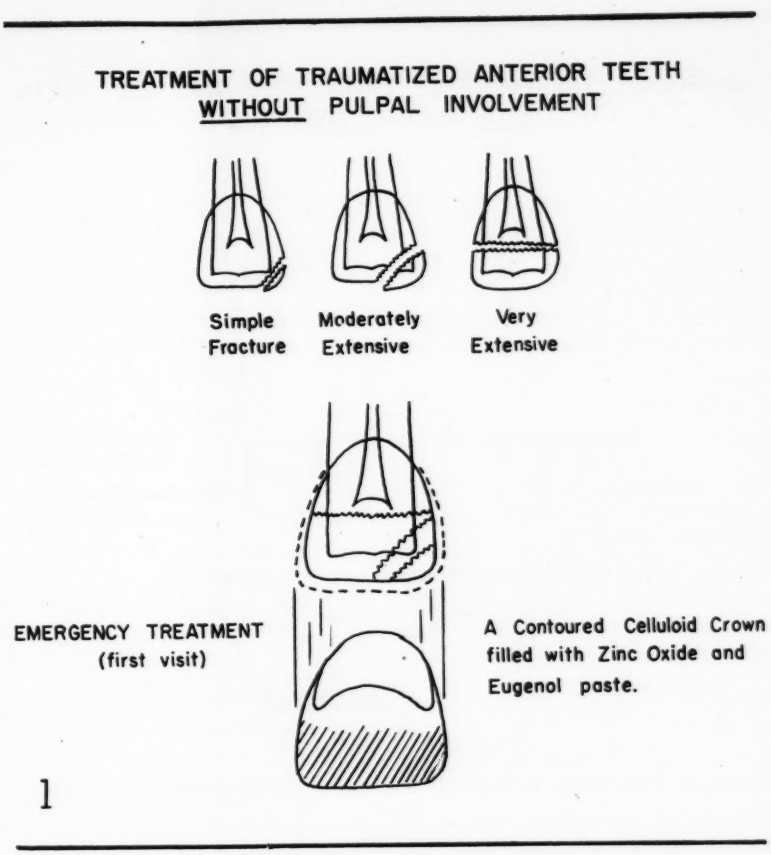
(2) Record the results of clinical examination.

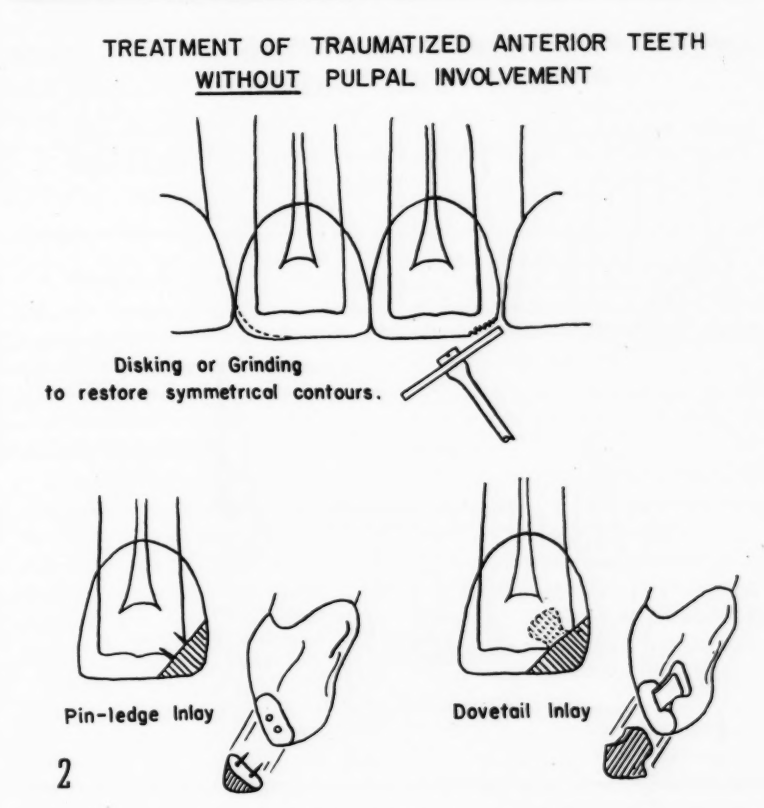
(3) Wash the fractured tooth with warm water.

(4) Isolate and dry the tooth.

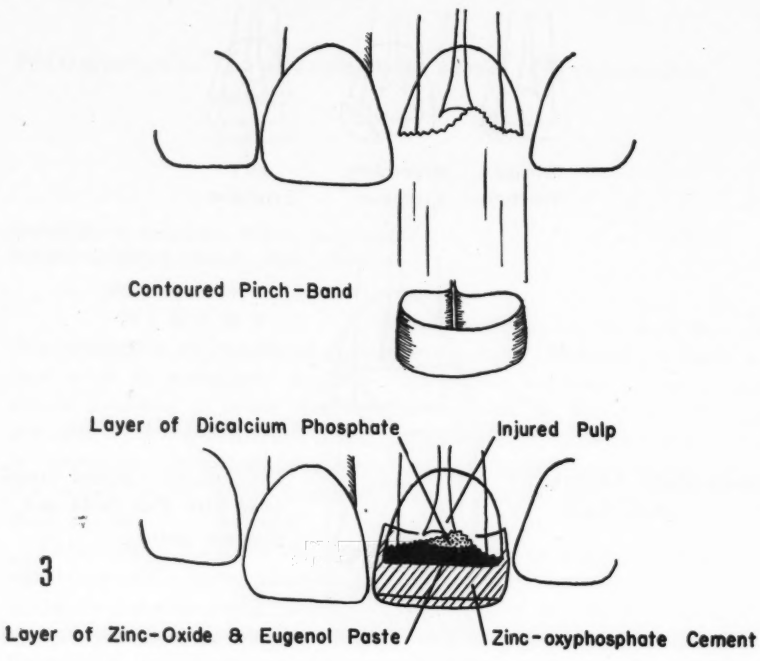
(5) Clean all surfaces of the tooth.

(6) Select a celluloid crown form of the proper size and shape; con-





EMERGENCY TREATMENT OF TRAUMATIZED ANTERIOR TEETH WITH PULPAL INVOLVEMENT



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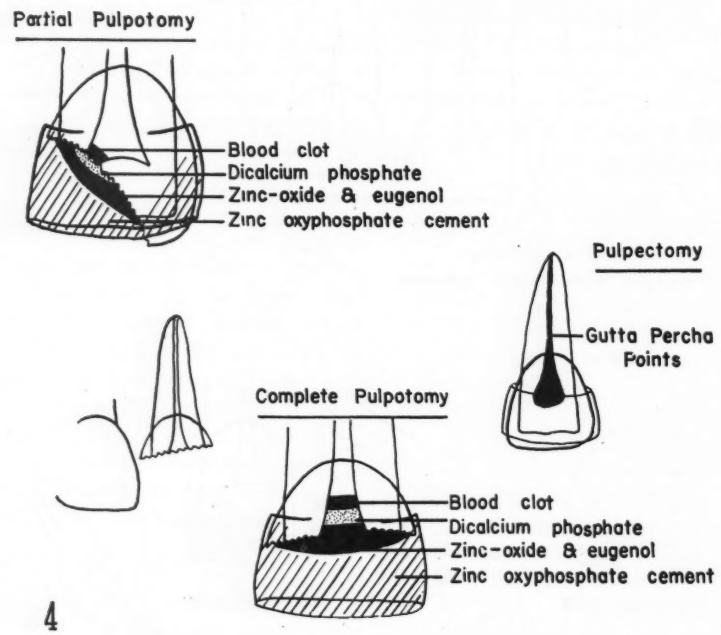
SUBSEQUENT TREATMENT OF TRAUMATIZED ANTERIOR TEETH WITH PULPAL INVOLVEMENT



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tour the crown to the correct type depending on the extent of the fracture, but do not allow it to impinge on the gingival tissue (Fig. 1).

(7) Check occlusion in centric and functional positions.

(8) Perforate the crown form with a Number 3 round bur on the lingual side in two places, about 2 millimeters gingivally from the incisal edge, to permit excess zinc oxide-eugenol paste to escape.

(9) Fill the crown form with a mixture of zinc oxide and eugenol and place in position over the tooth.

(10) Recall the patient in two to five days for observation. Repeat clinical tests and record.

(11) Recall the patient two weeks later. Repeat clinical tests and record.

(12) Dismiss the patient to allow a further period of physiologic rest for the pulp and for formation of secondary dentin.

Subsequent Treatment—After the measures described have been completed, before restoring the tooth the following steps should be taken:

(1) Recall the patient in six to eight weeks unless there is pain and repeat the clinical tests.

(2) Obtain radiograms for evidence of secondary dentin formation.

(3) If all conditions are normal, proceed with the restoration of the tooth.

Types of Restorations—Nothing will substitute for the judgment of the dentist treating a particular patient and a specific tooth. A few suggestions concerning restorations that may be used are the following:

(1) Restorations by disking. In cases where only a proximo-incisal angle is lost or a part of the incisal edge, careful disking and polishing may be all that is necessary to restore normal contours. The disking may be done at intervals over several weeks and may involve dressing down adjacent teeth for balance and esthetics (Fig. 2).

(2) Pinch band.

(3) Restoration with an inlay (gold, acrylic, or porcelain). Retention is obtained by accessory pins or lingual dovetail. The pins should be extremely shallow in order to avoid injury to the pulp (Fig. 2).

(4) Crowns (Fig. 5): (a) Three-quarter basket crown, (b) gold-acrylic crown, (c) complete gold crown, (d) shoulderless acrylic crown, (e) porcelain jacket crown.

Treatment of Coronal Trauma and Fractures Involving Pulp

Ellis[2] stated that 60 to 70 per cent of fractured anterior teeth fall into this group. Treatment of the pulp may be conveniently divided into three plans, depending on the type of pulp exposure (Fig. 4):

1. Partial pulpotomy (when the fractured region exposes a pin-point area.

2. Complete pulpotomy (when a large area of the pulp is exposed).

3. Pulpectomy (when the pulp is exposed and untreated for some length of time so that the pulp is dying or already necrotic).

Treatment may be planned as follows:

1. Record the history.
2. Record the clinical examination.
3. Roentgenographic examination.
4. Determine the plan of treatment to be adopted (partial pulpotomy, complete pulpotomy, or pulpectomy).

Partial Pulpotomy

Indications — Partial pulpotomy may be used when the following conditions are present:

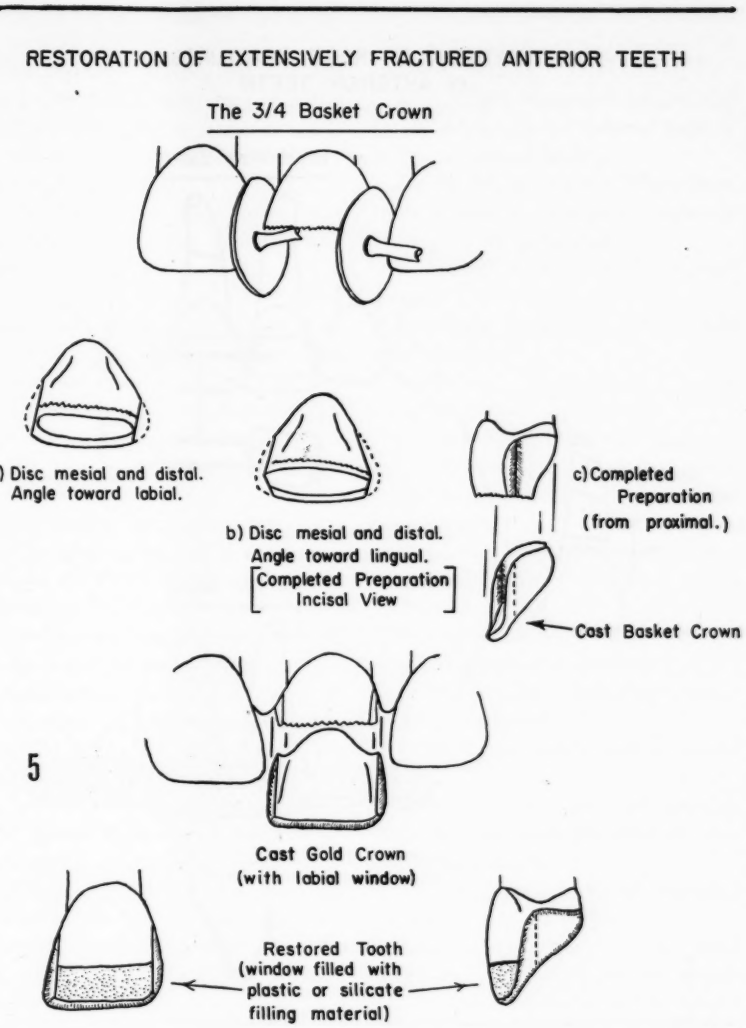
1. Small exposure.
2. No degenerated tissue.
3. Pulp not exposed longer than fifteen to eighteen hours.
4. If the tooth is vital with marked reaction to touch with sterile moist cotton.
5. No other complications.

Treatment Procedure (Fig. 3)— The following steps are included in the procedure for partial pulpotomy:

1. Prepare a sterile tray and instruments.

2. Isolate the tooth with a rubber dam. Paint the field with 3 per cent iodine, wash off with alcohol, wipe clean with warm sterile water on cotton pellets, and dry. Be careful to keep iodine and alcohol away from site of exposure.

3. Do not use strong drugs on the pulp or dentin.


RESTORATION OF EXTENSIVELY FRACTURED ANTERIOR TEETH
The 3/4 Basket Crown
a) Disc mesial and distal. Angle toward labial.
b) Disc mesial and distal. Angle toward lingual.
[Completed Preparation Incisal View]
c) Completed Preparation (from proximal.)
Cast Basket Crown
5
Cast Gold Crown (with labial window)
Restored Tooth (window filled with plastic or silicate filling material)

4. With a clean sterile round bur (slightly larger than the exposure) penetrate the pulp only enough to remove the superficial layer and *to cause hemorrhage.*

5. Wash the site with sterile saline solution and dry with cotton.

6. MAKE SURE THAT A GOOD BLOOD CLOT HAS FORMED BEFORE PROCEEDING TO THE NEXT STEP. A good blood clot is necessary if the operation is to be successful. Remove excess blood from dentin as it will decompose later and discolor the tooth.

7. Cover the site of exposure and blood clot with a pulpotomy powder consisting of sterile dicalcium phosphate plus 100 units of penicillin. Avoid placing any pressure on the amputated pulp. At least 1 millimeter of blood clot should cover the exposed pulp and about 1 millimeter of dicalcium phosphate powder should cover the clot.

8. Cover the pulpotomy powder with a thin paste of zinc oxide and eugenol.

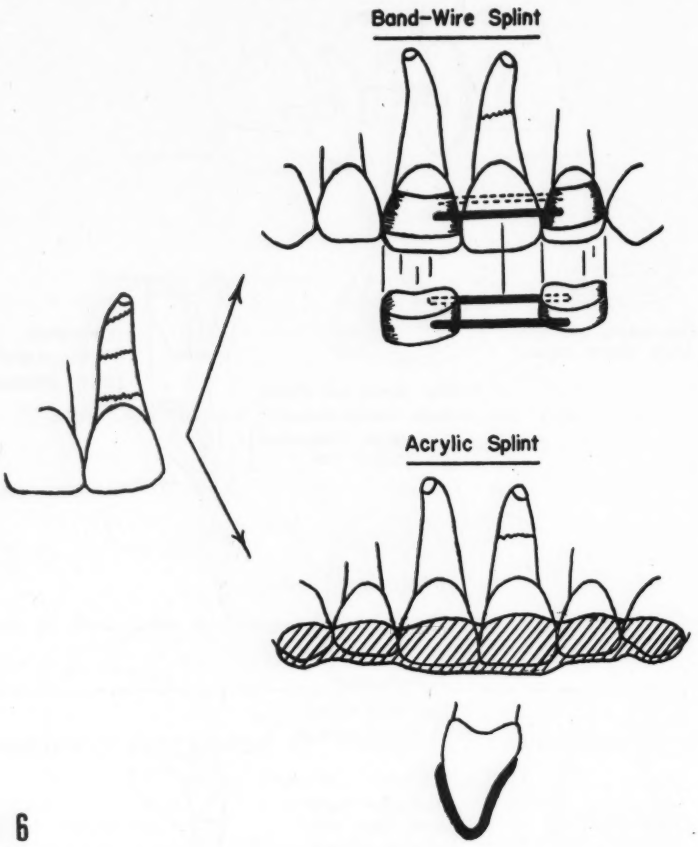
9. Cover these with a rapid setting cement. Avoid pressure at all stages of the procedure.

10. Clean all the surfaces of the tooth. Select a celluloid crown form of suitable size and shape. Check occlusion in centric and functional positions and perforate the crown on the lingual.

11. Fill the crown with cement and place in position. *Check the bite.*

12. Advise the patient to return in one week for observation, or at once

TREATMENT OF ROOT FRACTURES
IN ANTERIOR TEETH



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if pain is experienced. Allow a physiologic rest period of eight to ten weeks. If results of clinical and radiographic examination are satisfactory at that time, complete one of the restorations recommended previously.

Pulpotomy

Indications for Pulpotomy—The following factors should be taken into consideration for pulptomy procedure:

1. The exposed part of the pulp may be extensive but not infected or degenerated.
2. Definite evidence of vitality.
3. Root apex wide open.
4. Hemorrhage may have occurred; the time of exposure should not be longer than seventy-two hours.
5. No other complications.

Treatment (Fig. 4)—The method of treatment is the following:

1. The technique is aseptic. Operating tray, instruments, and dressings should be sterile.
2. Anesthetize the tooth.
3. Isolate the tooth and adjacent teeth with a rubber dam.
4. Swab the operating field with 3 per cent iodine and cleanse with a wash of 70 per cent alcohol.
5. Open the pulp chamber with a Number 9 round bur and obtain full access to pulp chamber with a straight cylinder diamond stone or large bur.
6. Select a sharp fresh sterile Number 11 round bur and direct it apically, and then against, the dentin walls. Cut the pulpal filaments quickly and cleanly. This avoids the pulling and stretching of pulpal elements by use of a spoon.
7. The point at which the pulp is amputated is 1 to 2 millimeters apical to the cemento-enamel function.
8. Control hemorrhage by touching the pulp with cotton pellets. If this fails, use warm air. Fibrinfoam and other related hemostatics may be used. A GOOD CLOT IS ESSENTIAL.
9. Cover the pulp stump with dicalcium phosphate (containing 100 units of penicillin). Avoid pressure.
10. Cover the pulpotomy powder with a thin mix of zinc oxide and eugenol and seal the entire cavity by means of a crown form and oxyphosphate cement.
11. Dismiss the patient. Recall the patient in eight to ten weeks and proceed with the restoration if it is indicated by conditions.

Pulpectomy

Indications for Treatment—If the following conditions prevail, pulpectomy is advised:

1. If the pulp is putrescent or degenerated.
2. No discharging sinus.
3. Root development complete or nearly complete.
4. If a satisfactory restoration can be placed.
5. Periodontal tissue should be intact over two-thirds of root length.
6. No complications.
7. If the patient is in good health.
8. No cyst formation.

Treatment—The following steps are recommended:

1. Anesthetize the pulp, when necessary, with local anesthetic.
2. Isolate the tooth with a rubber dam and sterilize the field of operation.
3. Use only sterile instruments, tray, and dressings.
4. Gain access to pulp chamber and remove the bulbous, coronal part of the pulp with a large round bur.
5. Explore the canal with a pathfinder and remove the pulp with a barbed broach.
6. Ream the canal, enlarge, and clean thoroughly.
7. Two negative cultures are necessary before the canal is filled.
8. Use gutta percha points and

root canal paste to fill canals (Fig. 4).

Treatment of Teeth with Root Fracture

Root fractures are not common in children because the anterior teeth are not fully erupted. Root fracture is more apt to occur after the crown is fully erupted, the root is fully developed, and the supportive structures have firmly fixed the tooth in position. Numerous reports have indicated that a large number of teeth with fractured roots remain vital and normal for many years after the accident. Hasty extraction of these teeth is to be condemned.

Diagnosis (Fig. 6)—Consideration of the following conditions will be helpful in diagnosis:

(a) Most cases of fracture of the root occur in the middle third of the root. Only a small percentage occurs in the apical third while almost none is reported in the cervical third.

(b) Teeth with root fractures in the cervical third are usually lost soon after the accident. These teeth are extremely mobile and the prognosis is poor.

(c) The line of fracture usually runs horizontally or transversely across the root. Occasionally diagonal fracture lines are seen. In the former instance, every effort should be made as soon as possible to realine the segments by manipulation of the crown section. Correct apposition of the fractured surfaces is essential for successful treatment.

Requisites for Successful Treatment—(1) Fragments must be in close apposition, (2) the fracture line must not be in the cervical third of the root, (3) there must be no infection, (4) the patient's general health should be satisfactory, and (5) there must be immobilization of fragments.

Treatment—Four methods of stabilizing the coronal section of a tooth with a fractured root are commonly used: (1) wiring, (2) use of a band splint, (3) a cast splint, or (4) a matrix splint (Fig. 6).

Wiring: (1) Wiring may be applied either as a temporary measure until a better splint is made, or it can be left in position and adjusted every two or three weeks.

(2) Twenty-five-gauge brass wire or 30-gauge stainless steel wire is used.

Band Splint (Fig. 6): (1) Pinch bands are constructed for the fractured tooth and adjacent teeth. The bands are soldered together in correct positions and then cemented to place.

(2) Leave three to six months, as indicated.

(3) As an alternative two wires can be used instead of a band on a painful fractured tooth. One wire is placed on the lingual, one is placed on the labial, and they are soldered to the bands of the adjacent teeth.

Cast Splint (Fig. 6): (1) Take an impression. (2) Make an investment cast. (3) Wax the splint to outline. (4) Cast the splint in hard gold or in acrylic. (5) Cement in position. (6) Leave three to six months, as indicated.

Matrix Splint: (1) Take an impression. (2) Make a stone cast. (3) Burnish 36-gauge 24-carat gold plate to outline. (4) Conform 18-gauge round wire to outline. (5) Wax plate and wire together. (6) Remove, invest, and unite with solder. (7) Finish and cement to place. (8) Leave three to six months, as indicated.

Treatment of Displaced Teeth

For treatment of teeth with partial displacement where there is extreme mobility and little displacement the following steps are suggested:

1. Prescribe warm saline mouth washes.
2. Advise the patient to avoid occlusion on the injured tooth.
3. Tell the patient of the possibility of pulp necrosis and the need for continued periodic observations.
4. The policy should be one of watchful waiting.
5. If slight extrusion occurs, the incisal edge may be reduced later in stages to restore length.

Partial Displacement—Where there is extrusion the following treatment routine is recommended:

1. Prescribe warm saline mouth washes.
2. Advise the patient of possible pulp necrosis.
3. Reduce displacement under anesthesia (local or general).
4. Immobilize the tooth temporarily with wiring or compound splint while a permanent splint is under construction.
5. Cement the permanent splint and leave in place from three to six months.
6. Tell the patient of the importance of a periodic check-up.

Intrusion—The following treatment is suggested:

1. Prescribe warm saline mouth washes.
2. Advise the patient of possible pulp necrosis and the need of periodic observation.
3. Follow a policy of watchful waiting.

Total Displacement—When total displacement of the tooth has occurred the following steps may be taken:

1. If seen early enough after the accident, reimplant the tooth after preparation.
2. Remove the pulp and fill the root canal.
3. Prepare the root surface; scrape off hanging tissue and clean thoroughly.
4. Immobilize three to six months.
5. Instruct the patient to report any discomfort and to return for periodic observation. For a comprehensive review of displacement of teeth the work of Ellis[2] is recommended.

808 *South Wood Street.*

Dental FOCAL INFECTION

Part One

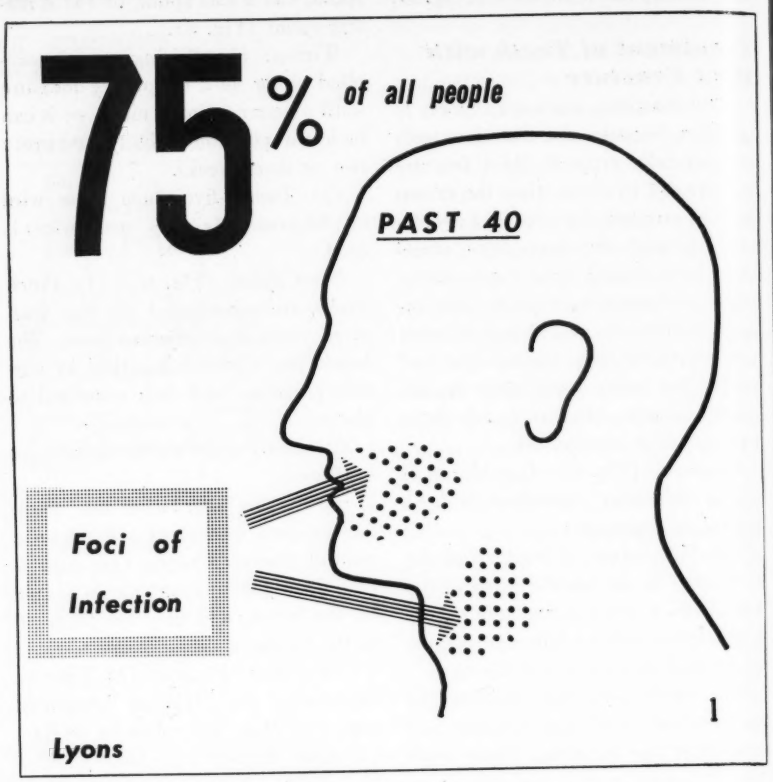
LOUIS I. GROSSMAN, D.D.S.
Philadelphia

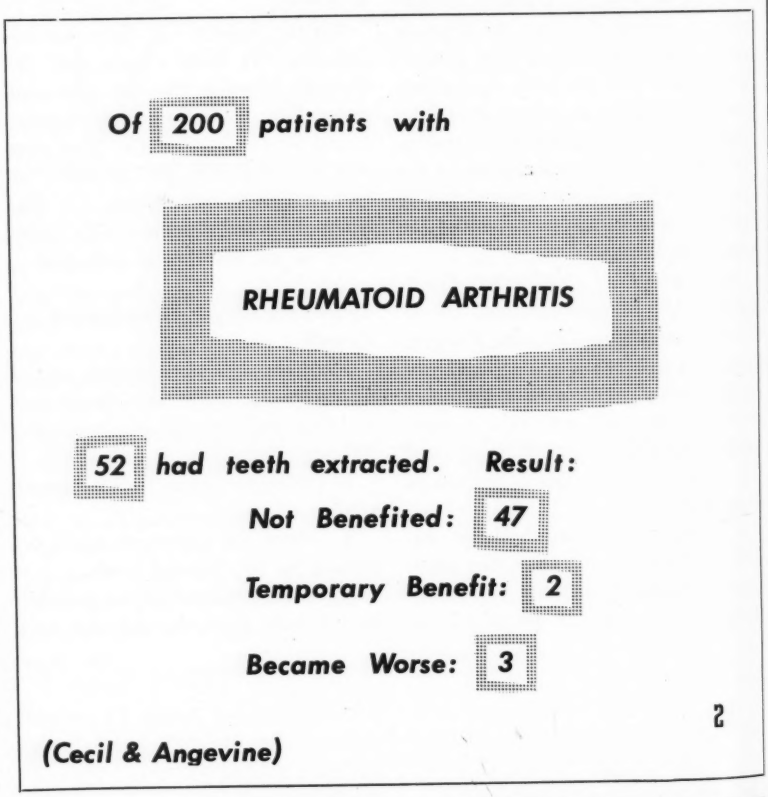
DIGEST

Focal infection has engrossed the attention of the medical and dental professions for the last forty years. During this time many ills were attributed to foci of infection, particularly in the case of diseases difficult to diagnose or treat. Is it possible that where improvement following removal of such foci occurred, psychosomatics went hand in hand with surgery?

Dental foci of infection received their share of criticism, particularly periapical foci of infection. In fact, in addition to pulpless teeth, many vital teeth were also extracted in the hope of benefiting the patient. In recent years there has been a gradual recognition that dental, as well as other, foci of infection play a minor role in the causation of systemic disease

In this article, which is the first in a series of three presentations on the subject, the results of investigation into the relation of dental foci of infection and arthritis, heart disease, and other systemic disease are recorded.





Infection in People Over Forty

As shown in Figure 1, Lyons[1] stated the following concerning dental foci and systemic disease: "Further evidence against the role of such infections producing systemic disease is the fact that foci, particularly about the teeth, may be found in 60 to 75 per cent of all people over the age of forty.

"If the focal infection theory is to be accepted, one must explain why foci present in the body for years will suddenly cause disease or, on the other hand, why such diseases develop in young children or adults in the absence of demonstrable foci."

Chronic Rheumatoid Arthritis

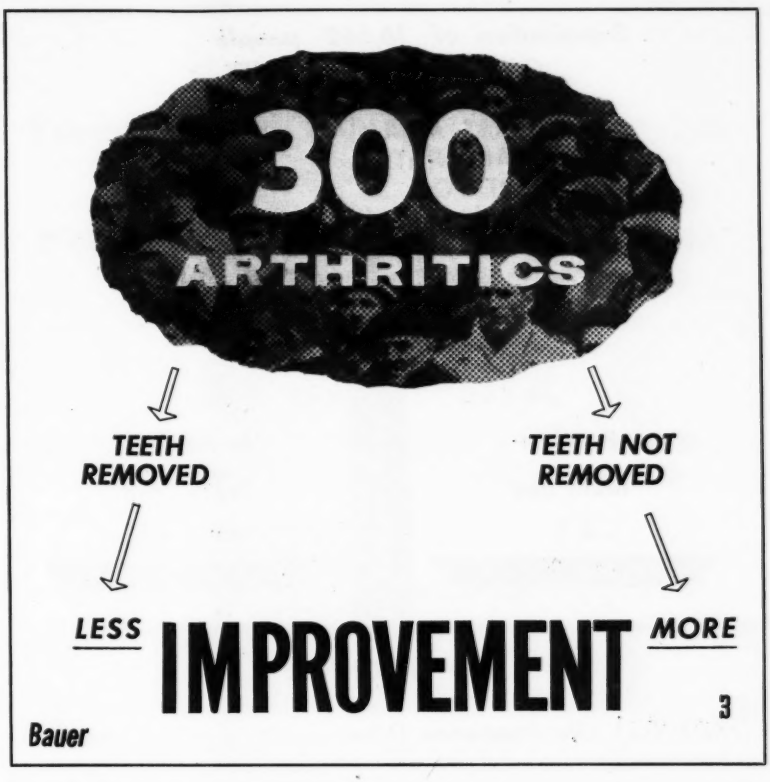
Cecil and Angevine[2] investigated the results in a series of 200 patients with chronic rheumatoid arthritis for whom foci of infection were removed. The number of those who improved is insignficant and is balanced by the number who became worse (Fig. 2).

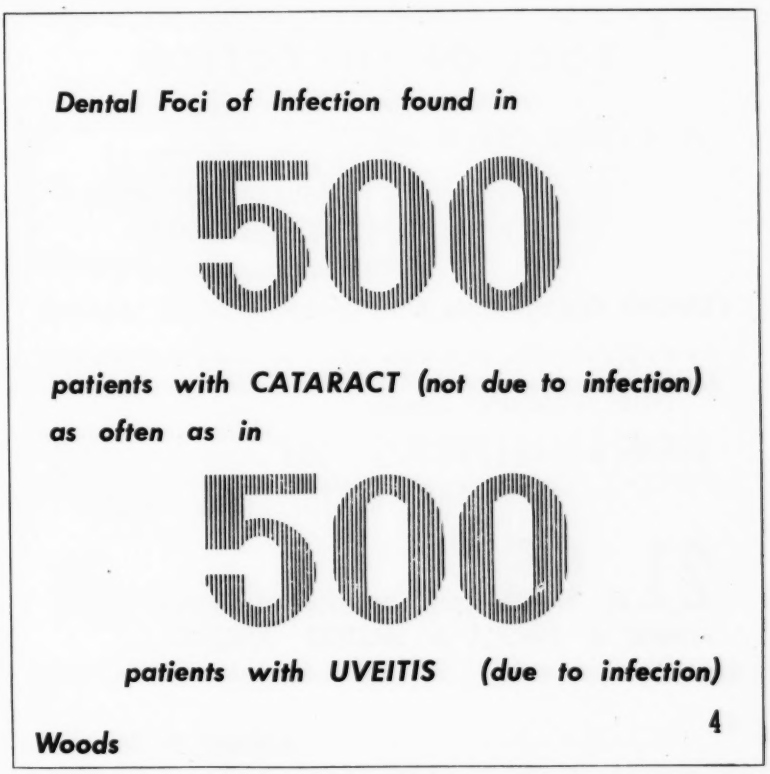
In 52 patients for whom teeth were removed, 47 were not benefited, 2 were benefited temporarily, and 3 became worse. It is interesting to note that ten years prior to this report Cecil had favored the theory of focal infection, and like other investigators at that time, reported improvement in a number of cases where foci of infection had been removed. Subsequent observation of the cases, however, did not sustain the original impression.

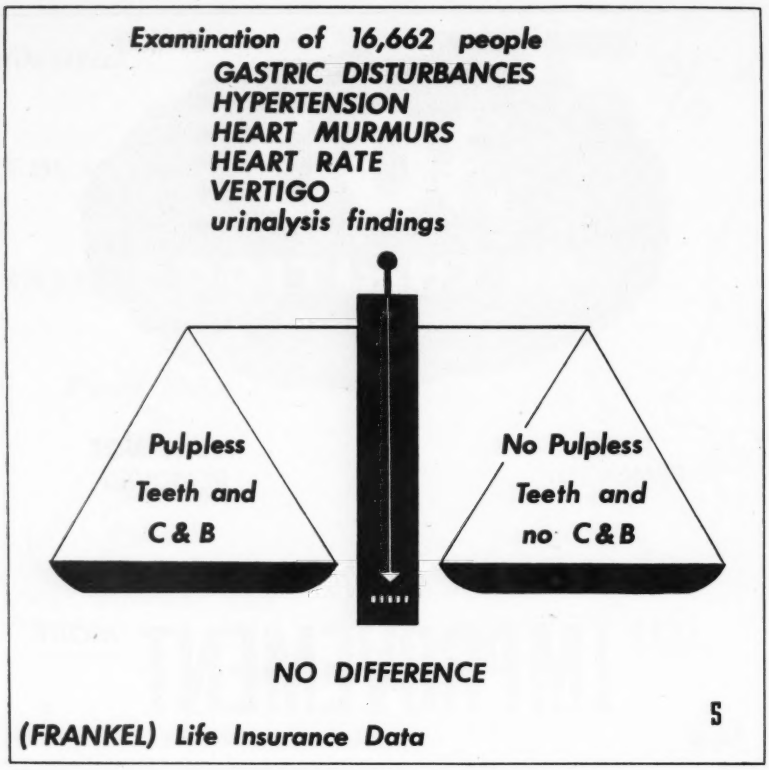
Three Hundred Arthritic Patients

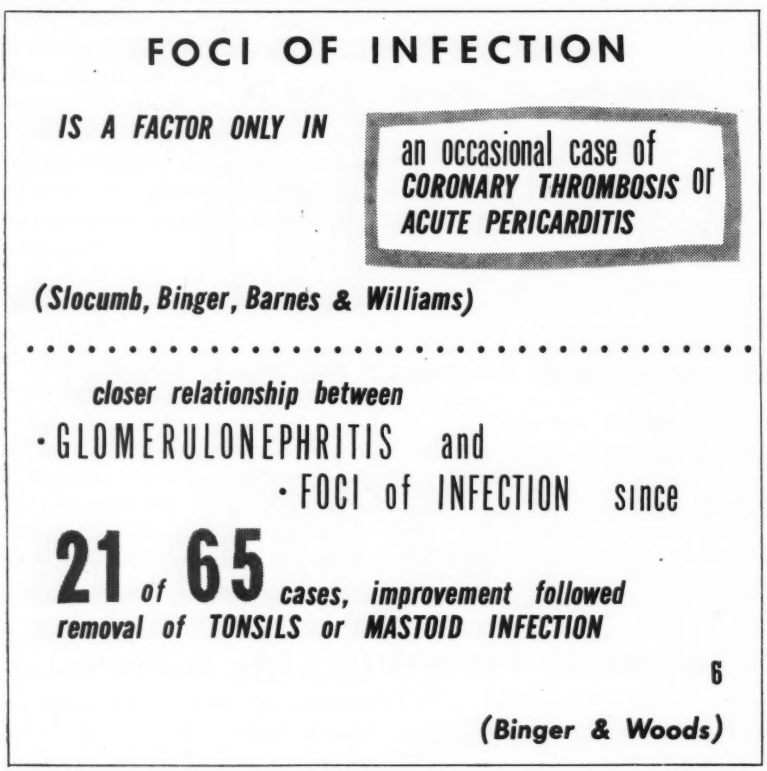
Bauer[3] made an evaluation of the effect of removing teeth on the arthritic condition in a series of 300 arthritic patients. These patients were divided almost equally into 2 groups; namely, those for whom teeth had been removed and those for whom teeth had not been removed. The patients for whom teeth had been removed showed less improvement than

[1]Lyons, R.: J. Endodont. **1**:39 (Dec.) 1946.
[2]Cecil, R. L., and Angevine, D. M.: Ann. Int. Med. **12**:577 (Nov.) 1938.
[3]Bauer, W. W., et al., cited by Reimann, H. A., and Havens, W. P.: J.A.M.A. **114**:1 (Jan.) 1940.








FOCI OF INFECTION
IS A FACTOR ONLY IN
an occasional case of CORONARY THROMBOSIS or ACUTE PERICARDITIS
(Slocumb, Binger, Barnes & Williams)
closer relationship between
· GLOMERULONEPHRITIS and
· FOCI of INFECTION since
21 of 65 cases, improvement followed removal of TONSILS or MASTOID INFECTION
6
(Binger & Woods)

those for whom teeth had not been removed (Fig. 3).

Eye Infections

Because of the proximity of the eyes to the teeth with possible extension of infection from the teeth to other parts of the head, dental foci of infection have often been incriminated where eye infections were present.

Woods[4] made a survey of the existing literature on focal infection with reference to eye infection. He concluded that most cases reported did not support the contention that a relationship existed between eye disease and foci of infection elsewhere in the body.

In a study which Woods made of more than 500 patients (Fig. 4) who had cataract (which is not due to infection), dental foci of infection were found quite as often as in another group of 500 patients with uveitis (which is of an infectious nature). Woods concluded that the removal of "minor and symptomless foci of infection as a cure-all for endogenous ocular disease" was unjustified.

Systemic Disease

In studying the incidence of systemic disease in a group of nearly 17,000 people with and without pulpless teeth (and crown and bridge appliances), Frankel[5] concluded that the incidence of systemic disease in one group was not greater than in the other (Fig. 5).

Heart Disease

Dental foci of infection has also been suspected where heart disease is present:

1.Slocum,[6] et al., in reviewing the data of the Mayo clinic found that foci of infection was a factor only in an occasional case of coronary thrombosis or acute pericarditis.

2. One of Slocum's associates found a closer relationship existing between glomerulonephritis and foci of infection.

[4]Woods, A. C.: Am. J. Ophth. **25**:1423 (Dec.) 1942.
[5]Frankel, L. K.: Dental Cosmos **66**:35 (Jan.) 1924.
[6]Slocum, C. H., et al.: J.A.M.A. **117**:2161 (Dec.) 1941. Binger, M. W., and Woods, R. M., quoted by Slocum, et al., vide supra.

3. In about one-third of the cases studied, improvement followed the removal of tonsils or mastoid infection (Fig. 6).

No doubt these infections could be controlled today by means of antibiotics.

Dyspepsia

According to Vaizey and Clark-Kennedy,[7] of 76 patients for whom teeth were removed for dyspepsia (Fig. 7), only 6 (8 per cent) benefited.

In another study made by these authors (Fig. 8) the teeth were removed for purely dental reasons in 126 patients. Of this number, 39 (31 per cent) developed symptoms of dyspepsia and 19 (15 per cent) developed arthritic symptoms. The relationship between foci of infection and this gastrointestinal disorder is certainly not impressive.

University of Pennsylvania
School of Dentistry.

[7]Vaizey, J. M., and Clark-Kennedy, A. E.: Brit. M. J. 1:1269 (June) 1939.

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teeth of 76 patients removed for possible

DYSPEPSIA

only 6 (8%) benefited

Vaizey & Clark-Kennedy 7

126

Patients for whom teeth were removed for DENTAL REASONS

39 (31%) ***DEVELOPED SYMPTOMS OF DYSPEPSIA***

19 (15%) ***DEVELOPED RHEUMATIC SYMPTOMS***

(Vaizey & Clark-Kennedy) 8

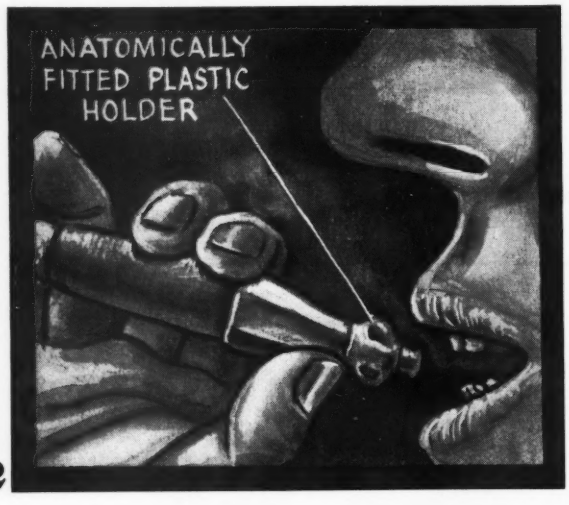
1

Clinical and Laborato

Trimming Plaster Models

E. A. Franks, D.D.S., Silver Lake, Ind.

1. Plaster models may be better trimmed by using a 16-inch meat saw than by using a hack saw.

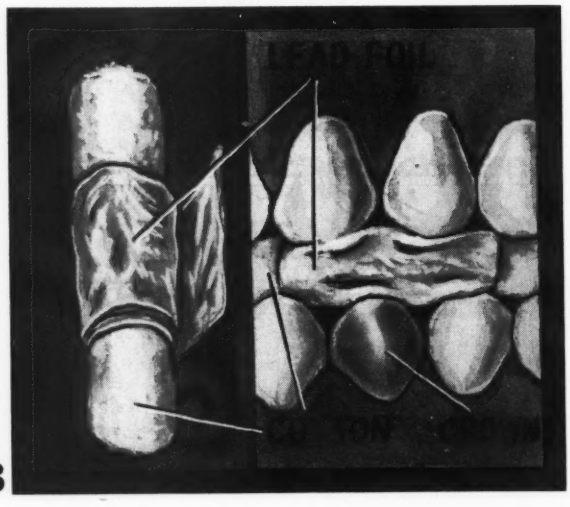


2

Anatomic Cigar Holder for Denture Wearers

S. M. Dooreck, D.D.S., Brooklyn, N.Y.

2. Denture wearers frequently experience difficulty in using a cigar holder. To overcome this difficulty, and to make an individual anatomic holder, wrap a layer of wax around a standard cigar holder and have the patient register his bite. Invest the holder sectionally in plaster. Using a quick-curing acrylic, an anatomic accurate holder is produced.



3

An Aid in Cementing Inlays and Crowns

Lt. Francis D. Dunne, (DC) USNR Camp Lejeune, N.C.

3. Two or three pieces of lead foil that are removed from exposed Number 2 x-ray packets are wrapped around a cotton roll to give an excellent biting surface to use when cementing inlays and crowns. The cotton roll with lead foil has sufficient body to ensure complete seating of the restoration and has sufficient compressibility to ensure contact with a large area of the occlusal surface. Cement will not stick to the lead foil.

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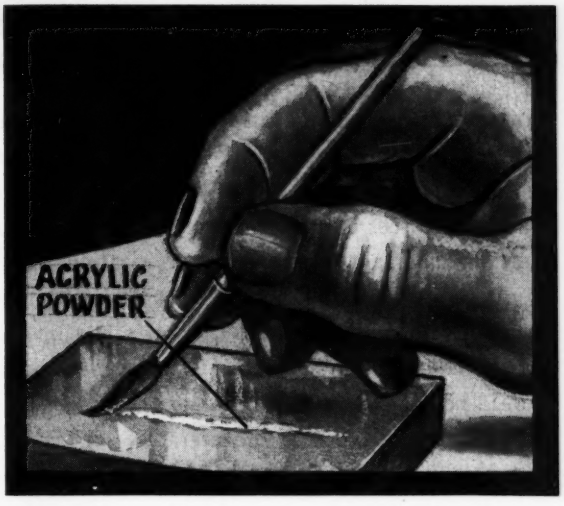
SUGGESTIONS . . .

An Aid in the Acrylic Brush Technique

Charles W. Brewer, D.D.S., Chicago

4. When placing an acrylic restoration with the brush technique described by Nealon, it is easier to control the amount of powder picked up by spreading the powder in a thin line on the cement slab and working from one end.

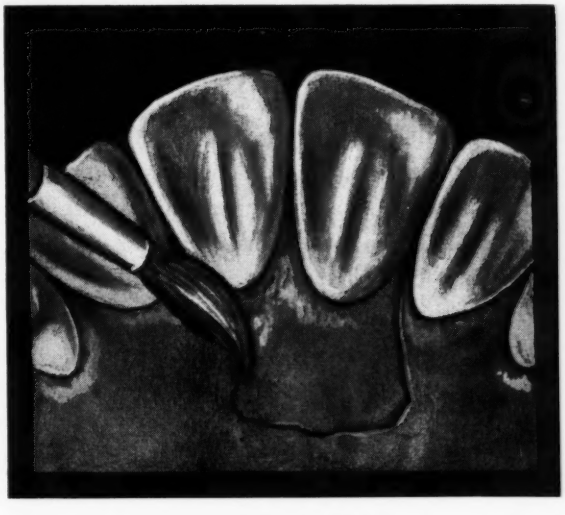


4

A Quick Denture Repair

Vernon R. Damer, D.D.S., Peru, Ill.

5. Remove the broken tooth and cut retention in the base material on the lingual only. Using a fast curing denture acrylic and the brush technique, it is possible to do a neat repair without subjecting the denture to heat processing.

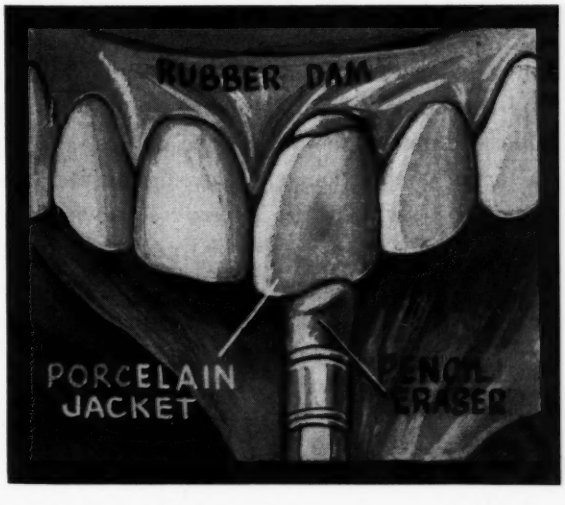


5

Cementing a Porcelain Jacket Crown

W. S. Bardwell, D.D.S., Pullman, Wash.

6. To prevent fracture of the crown due to cementing procedure, apply the rubber dam to ensure a clear, dry field. Mix the cement and place the crown on the preparation. Gently carry to place, using the rubber eraser from a pencil. Hold in position with the eraser for a few moments to permit the cement to set.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 458 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

FOLLOWING an exhaustive investigation on denture sore mouth (DSM) Nyquist[1] has concluded that most cases of this condition are the result of various traumatic forces and that allergy and chemical irritations from unsatisfactory polymerization are infrequent in incidence. Disturbances of circulation, local infections, and systemic disease may be factors in the causation of DSM, but these possibilities should be considered to be remote ones.

In his examination of the literature on the subject Nyquist found the following conditions mentioned as the principal causal factors in DSM:

"(1) *Non-physiological conditions.* Every denture sets up abnormal conditions in the mucosa. This results in disturbance of the blood circulation, the secretion and the self-cleaning capacity.

"(2) *Traumatic injuries.* During chewing and speaking the denture makes small movements against the mucosa. In certain cases, poor surface and marginal fit, and traumatizing occlusal relations will also be found. These will cause some displacement between mucosa and denture. Any resulting injury to the mucosa will be of a purely traumatic nature.

"(3) *Heat accumulation.* Baseplate materials of low thermal conductivity, such as rubber and various kinds of synthetic resins, may give rise to an accumulation of heat. The permanently raised temperature might conceivably have a deleterious effect on the mucosa.

"(4) *Putrefaction.* Poor oral hygiene and inadequate cleansing of the denture set up conditions whereby food remains, desquamated epithelial cells and retained glandular discharge provide a favorable medium for the oral bacterial flora, and this factor in conjunction with the slightly increased temperature will have a strongly septic influence on the mucosa. Porosity, especially surface porosity of the base material, promotes bacterial growth by providing retention sites, thus contributing to oral sepsis.

"(5) *Chemic-toxic injuries.* The base material itself or its constituents, such as dyes, stabilizers, accelerators, may cause chemico-toxic injury to the mucosa.

"(6) *Allergic reactions of the mucosa.* The base material or its constituents may give rise to allergic reactions of the mucosa. Cleansing materials for the denture may have a similar effect.

"(7) *Effect on the autonomic nervous system.* The base material may have a disturbing effect on the balance in the autonomic nervous system.

"(8) *Depression of vital resistance due to systemic disease.* Systemic diseases such as diabetes, nephritis, anemia, conditions of vitamin deficiency, and hormonal disturbances are considered to reduce the vital resistance to trauma of the oral mucosa. Inflammatory changes might thus arise more easily."

To prevent the development of DSM Nyquist states that the following points should be observed:

"1) Ensure that the supporting tissue is firm.

2) When arranging the teeth bear in mind the laws of statics. [Be certain that there are no traumatic interferences when the teeth are not in masticatory function.]

3) Avoid the use of vacuum chambers and similar devices.

4) Ensure good marginal and surface fit of the denture.

5) Perform a careful grinding of the finished denture to give correct centric occlusion and completely balanced articulation.

6) On account of the slow nature of the changes to both the denture and the subjacent tissues, the surface fit, occlusion and articulation should be checked from time to time."

On the last point most clinicians are notably deficient. We share the error of many patients by thinking that a denture is "permanent." Few of us insist that our full denture patients return regularly for professional evaluation. If the denture is reasonably comfortable and not too loose we are inclined to accept the patient's doctrine of noninterference.

[1]Nyquist, Göte: A Study of Denture Sore Mouth, Acta Odontologica Scandinavia 10: Supplement 9, 1952.

MEDICINE and the Biologic Sciences

Pregnancy and Heart Disease

Approximately two per cent of all pregnant women are afflicted with some form of heart disease. This is quite a sizable group and is a group in which the hazards of pregnancy exceed those encountered in normal pregnant women. The maternal mortality of patients with heart disease is still five times that of women with normal hearts.

The hemodynamic adaptive mechanism incident to pregnancy not only increases the cardiac load but by its very nature produces signs and symptoms which imitate those seen in heart disease and in congestive failure.

The circulatory alterations taking place are the following: (1) There is a progressive rise in the cardiac output commencing at about the twelfth week. This attains a maximum volume about the thirty-sixth week of gestation at which time it exceeds the control minute volume by 50 per cent. There is then a gradual decline and a return to normal within several weeks postpartum.

(2) An augmentation of the circulating blood volume parallels the cardiac output. A maximum volume of 50 per cent above the prepregnant state is reached by the thirty-sixth week. Thereafter there is a gradual reduction.

(3) The circulation time becomes less. Thus the circulation rate is accelerated as gestation advances.

(4) There is a gradual rise in the heart rate, which usually increases toward term.

These changes are designed to satisfy increased metabolic demands. The observer commented that "A pregnant woman at rest behaves similarly to a nonpregnant woman doing moderate work—that is, at rest she partly utilizes her reserves."

The normal changes complicate the diagnosis of heart disease in pregnant women. The signs and symptoms leading to the recognition of incipient congestive failure similarly require careful evaluation. The chief cause of maternal mortality in pregnant cardiacs is heart failure. Therefore it is important that all pertinent data be carefully gathered and evaluated in order to help prognosticate such a complication.

Additional work is imposed upon the circulation and stress increases as gestation advances. Sound principles of prognosis will often enable the physician to anticipate failure and careful frequent examination will enable him to recognize the early signs.

The determination of the prognosis of pregnancy in patients with rheumatic fever is facilitated by establishing the position which the patient occupies in the natural course of her heart disease. A poor risk is indicated by: (1) a history of previous failure, (2) diminished cardiac reserve, (3) the presence of auricular fibrillation, (4) long duration of the disease, and (5) an enlarged heart.

The appearance of basal râles, an enlarged liver which may be tender, true paroxysmal dyspnea and significant diminution of the vital capacity are dependable signs of congestive failure. Prompt treatment of failure will effectively reduce the greatest hazard confronting a patient with heart disease.

Bunim, Joseph J., and Taube, Harry: The Management of the Pregnant Woman with Heart Disease. M. Clin. North America **35**:667-676 (*May*) 1951.

Pernicious Anemia—Etiology

Normal hematopoiesis requires vitamin B_{12}, pteryoylglutamic acid and ascorbic acid. When one of these substances is lacking macrocytic anemia may result.

Hematopoiesis requires an interaction between substances found in food (extrinsic factor) and those present in gastric juice (intrinsic factor). Beef muscle extract is a convenient source of the extrinsic factor, B_{12}. It can be given either orally or parenterally.

When administered by parenteral injection the hematopoietic activity of beef muscle extract depends entirely upon vitamin B_{12} content. When used orally, potentiation by normal human gastric juice is no greater than when an equivalent amount of pure vitamin B_{12} is similarly employed.

Addisonian pernicious anemia is the result chiefly of a deficiency of vitamin B_{12}. This deficiency is predominantly due to a lack of gastric secretion, usually because of hereditary predisposition or advancing age. When vitamin B_{12} is not assimilated, hematopoiesis is adversely affected. This often affects the integrity of the alimentary tract and the nervous system.

In nearly all cases of Addisonian pernicious anemia vitamin B_{12} initiates and maintains complete hematologic and clinical remission. Such effects can be produced by the daily ingestion of very small amounts of the pure vitamin. Later the vitamin need be injected only once a month for maintenance purposes.

Little is known concerning the nature of the so-called intrinsic factor of normal gastric juice. This ther-

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molabile, alkali-resistant, nondialyzable substance is assumed to be an enzyme.

The hematopoietic effect of beef muscle extract and vitamin B_{12} is greater when administered parenterally than when given orally in identical amounts with gastric juice. Perhaps the function of the intrinsic factor is merely to facilitate the absorption of vitamin B_{12} from the alimentary tract. Normal human gastric juice has the ability to render vitamin B_{12} unavailable for microbial growth.

Deficiencies of pteroylglutamic acid or ascorbic acid may be factors in the etiology of pernicious anemia. Usually, however, the etiology is complicated by one or more factors.

Castle, W. B.: Etiology of Pernicious Anemia, Ann. Int. Med. **34**:1093-1106 *(June)* 1951.

Typhoid Fever of Short Duration

A fact apparently known for a long time but neglected in the literature of recent years is being stressed today in the management of typhoid fever. This fact is that typhoid fever may run a short and mild course, particularly in children.

It is important to recognize this as too frequently a delayed diagnosis is made in many children. This is true in epidemics as well as in endemic areas.

Cough, nonproductive and hacking, and upper respiratory symptoms dominate the clinical picture. Constipation and diarrhea are frequently noted to cause considerable abdominal discomfort. The duration of the fever is short. In one series of cases the average duration was ten days. There is no correlation between the duration of fever and the severity of symptoms. In most of these patients the white blood cell count is within normal limits.

Usually there are no complications and the patients recover promptly. Often in epidemics of typhoid fever school children complain of vague abdominal symptoms without ever missing school. Careful histories should be made of these children. Diarrhea, constipation, abdominal discomfort and distention, chills, cough, and headaches should be recorded. Prompt laboratory proof should then be sought. Listlessness and somnolence is a constant symptom and should always point to a correct diagnosis.

Bauer, Franz K., and Bower, Albert G.: Typhoid Fever of Short Duration, Am. J. M. Sci. **222**:174-178 *(August)* 1951.

systemic antibiotic therapy—
without injection

Terramycin

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". . . a powerful and effective antibiotic . . ."
Winter, L., Jr., and VanGaasbeek, B.: *Terramycin in Oral Surgery*, New York State Dent. J. *18*:119 (March) 1952.

". . . produces as few side reactions as any antibiotic known."
Wright, L. T.; et al.: *Terramycin in Soft Tissue Infections*, Antibiotics & Chemotherapy *1*:165 (June) 1951.

". . . singularly low in side actions and has an unusually broad antibacterial spectrum."
Eisenbud, L.: *The Management of Acute Infections of Dental Origin*, J. Dent. Med. *6*:37 (April) 1951.

". . . responded to treatment within 24 hours of the first administration of terramycin."
Levy, A. T.: *Sublingual Phlegmon of Dental Origin Treated with Terramycin*, J. Calif. State Dent. A. (Jan.-Feb.) 1951.

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Peptic Ulcer—Follow-up

The actual cause of peptic ulcer is not known. It appears that the ulcer arises from numerous factors some of which are known and some of which are not known. It is unwise to assume that any single factor is the cause and to concentrate the treatment in this direction.

A peptic ulcer cannot develop in the complete absence of hydrochloric acid and pepsin in the gastric juice.

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 452 *and* 453)

Form to be Used by Contributors To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From:_____

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Subject:_____

_____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

This does not mean that ulcers are caused by hyperacidity, hypersecretion, or increased production of pepsin. Many ulcers have been found to occur when these factors are at a normal or even a subnormal level. Hyperacidity and hypersecretion seem to be associated with ulcers that are difficult to heal.

As a general rule, ulcer patients seem to possess an unusual drive and are extremely tense. They appear self-sufficient and are difficult to get close to psychologically. They are perfectionists at heart and are overly conscientious in regard to their work. Nothing they ever do really satisfies them inwardly, and, as a result, they tend to worry during their waking hours. Externally they usually appear calm, giving no evidence of their inward conflicts.

Periodic follow-up treatment is extremely desirable. For at least a year, the patient should be seen, preferably once a month. A complete general check-up should be made to determine any other adverse physical conditions that might be directly detrimental to the continued healed state of the ulcer, or that might affect the general health of the patient and indirectly cause a recurrence. Foci of infection should be removed. Dental hygiene should be carefully considered.

Few ulcer patients seem to have suitable relaxation and recreation. On the surface they may seem to be fairly well adjusted. However, close investigation may reveal that they may be at fault in their attitude toward relaxation and recreation. They should devote a period each day to some form of recreation entirely divorced from their usual work.

A definite attempt should be made to break the tobacco habit. The adverse effects of tobacco are threefold: (1) Nicotine absorbed into the blood stream in sufficient quantities depresses the sympathetic nerve endings, thereby allowing the vagus to have greater effect, which results in increased gastric secretion and motility. (2) The tars and other substances that are dissolved in the sputum when swallowed act as a gastric

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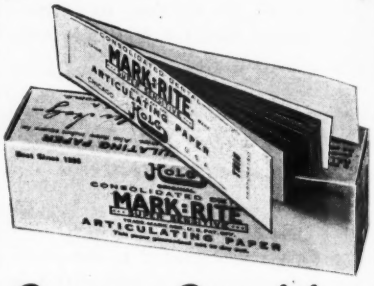

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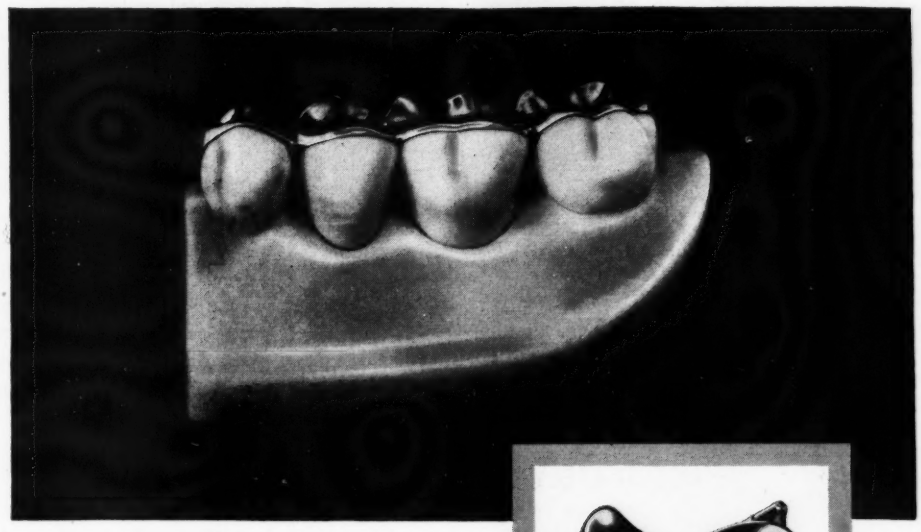

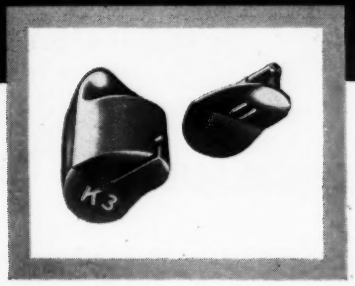

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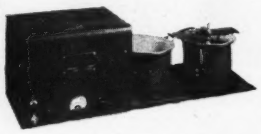

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irritant. (3) The appetite is decreased.

One or two cups of coffee or tea may be allowed. An occasional highball made of good whiskey and water can do no particular harm. Cocktails should be avoided for they are too concentrated and too irritating.

Meals should be eaten at regular intervals on a definite daily schedule. The amount consumed at each meal should be roughly the same each day. If the total intake of food be roughly divided into fifths as far as the caloric value is concerned, one-fifth should be consumed at breakfast, and two-fifths each at lunch and supper.

At least 8 to 10 glasses of water should be consumed during the day, more if the patient so desires. Milk and other liquids may be included in this total.

In general, the diet should be of the bland, low residue type. Raw foods or those containing much roughage should be avoided, as should a great deal of seasoning. Fried foods and those with tasty sauces and gravies are obviously not good. The diet should be well balanced with particular emphasis on sufficient protein.

Antacids and antispasmodics should be continued as long as the individual case warrants. It is a well known fact that ulcers tend to recur during the spring and fall. It is a very good idea to have the patient go back on his 6 feedings a day diet with full dosage of antacids and antispasmodics during the months of March and April, and September and October. In addition, he should be instructed to follow the same routine if he gets into any situation that is likely to engender nervous tension.

Gibb, William Travis, Jr.: The Follow-Up and Guidance Treatment of Peptic Ulcer, M. Annals District Columbia **20**:372-382 (July) 1951.

Tetanus Immunization

The organism causing tetanus grows only under strict anerobic conditions. It produces spores which are highly resistant and may lie dormant for years outside the body. They may also lie dormant for months in the tissues when conditions for their development are unfavorable.

Bacilli and spores are commonly found in cultivated and manured soils in most parts of the world. They are present in large numbers in the intestinal canal of the horse, domestic animals, and man. Growth in the tissues is facilitated by the presence of (1) trauma, (2) necrosis, (3) foreign bodies, and (4) pyogenic or other anerobic infections. The determining factor to which all these conditions is predisposed is a sufficiently low oxygen tension.

The classic wound to cause tetanus is penetrating, lacerated, and infected. Since the discovery of passive immunization, prophylactic antitoxin is almost always given after such wounds. This prevents the disease so

that today severe injuries of this type are not often the cause of tetanus. Occasionally much slighter, often trivial, injuries which have escaped passive immunization may cause tetanus.

If, in civilian life, prophylactic antitoxin could be given within twenty-four hours after all wounds only a small fraction of the present cases would occur. Of those which did occur, only a few would be fatal. Unfortunately, it is impossible to be certain whether a wound is infected with tetanus or not.

Typical examples of minor injuries causing tetanus are: (1) slight septic abrasions which have scabbed over, forming a pocket in which anerobes grow, (2) slight penetrating wounds as from thorns, splinters, a garden fork, or nail in a boot, (3) whitlows —especially in agricultural workers, (4) wounds which are dirty or septic, (5) infected material used in medicine and surgery, and (6) possible internal injuries.

Any general rule as to whether tetanus antitoxin should be given is impossible. The question should always be considered carefully in each case with a strong bias in favor of protection if there seems to be the most remote chance of tetanus. It is important to remember that tetanus almost always occurs in people who are careless about keeping their hands and feet clean. Among those who are clean in their habits it is rare.

Tetanus antitoxin is not entirely harmless. Some persons are extremely sensitive to horse serum. Such subjects may die or develop severe reactions within a few minutes after receiving the minute amount contained in a prophylactic injection of tetanus antitoxin. The risk of such reactions is relatively slight but the fact that they occur makes it advisable to give antitoxin only if there is a genuine risk of tetanus developing.

Cole, Leslie: Tetanus Immunization, Practitioner **167**:247-251 (*September*) 1951.

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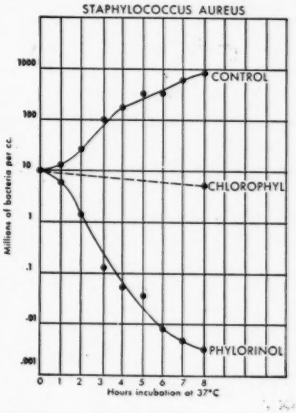

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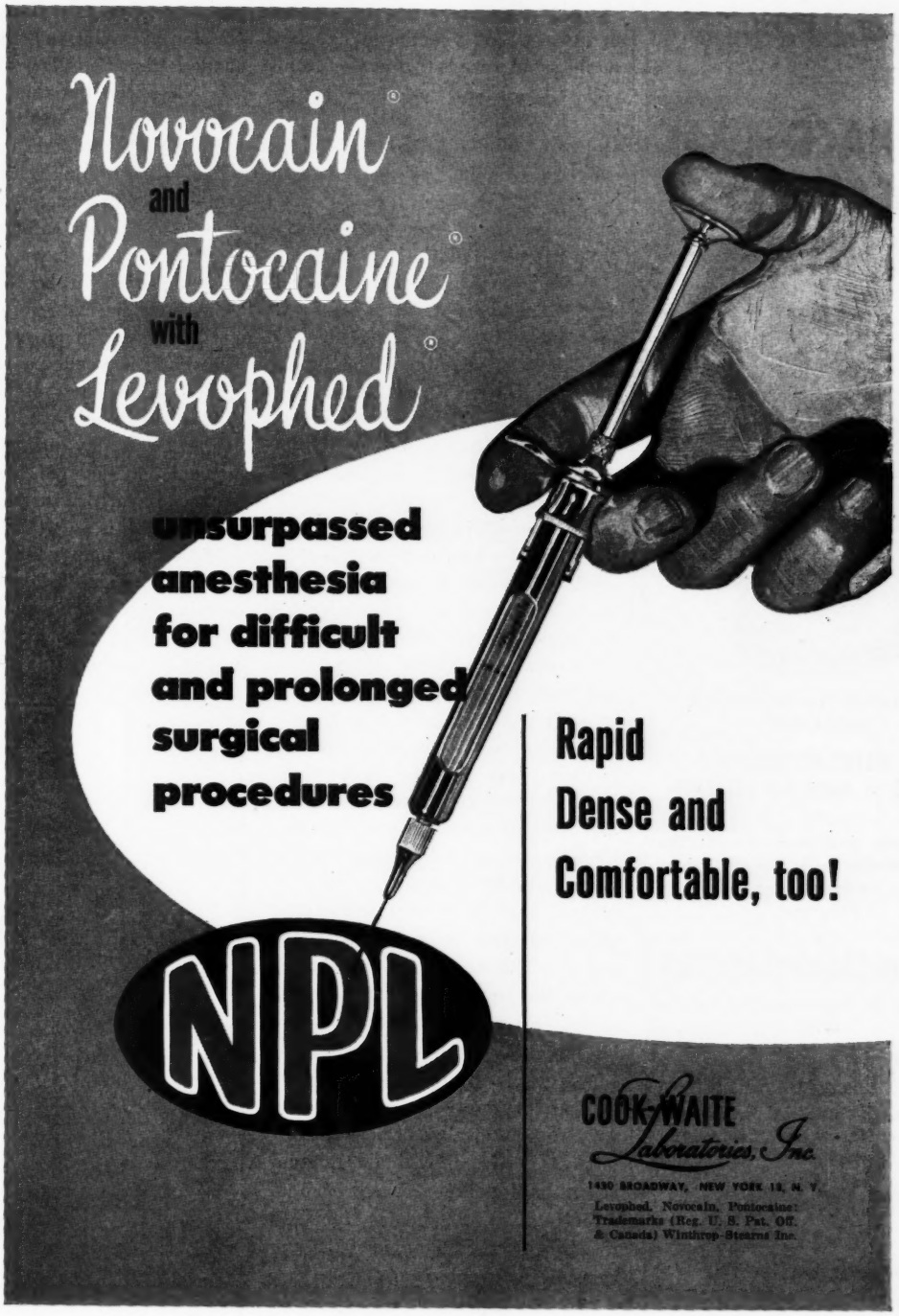
pathologic processes while relieving ourselves from the annoyance of bugs and insect pests.

I cannot think of the DDT that we inhale that I do not begin to wonder about some of the other chemicals in the atmosphere that we breathe. Industrial smoke is known to be full of noxious chemical fumes. In that connection I recall a manuscript that we once received. The author suggested that the exhaust fumes from automobiles, particularly the lead component in ethyl gasoline, was a cause of pyorrhea. We scoffed at the idea and promptly and curtly returned the manuscript to the author. Since then my thoughts have frequently returned to this rejected manuscript. Although I am unable to see how the disease that we call pyorrhea could be caused by automobile exhaust fumes, I am not as arrogant in my disbelief as I was when the manuscript was rejected. A good many people who have never been near an internal combustion engine have pyorrhea. It is not unlikely, however, that the frequent inhalation of lead combustion products may produce subclinical forms of lead poisoning and that this might be a contributing factor in some cases of periodontal disease.

Although I am not a flying saucer enthusiast and believe that the things we are seeing skipping around the skies are natural phenomena, I am a bit skeptical about what may be happening to us with all these atomic fission products floating around in the atmosphere. An atom bomb set off in the deserts of New Mexico may not kill anyone outright and dramatically but how about all the radioactive particles that are windblown on high and deposited all over the country? Sure, somebody is going to protest and say that unless a Geiger instrument can count the presence of these radioactive particles there is no danger involved. No physicist am I but I feebly remark that Geiger counter or not I am a bit uneasy with the thought that all these atomic fission products are drifting around, dropping in the soil from which our food comes, in the water that we drink, in the air that we breathe. Again I wonder what the cumulative effects of these sublethal atomic bombardments may be on the nation's health.

Most of the food that we eat has been tampered with. We have substituted chemicals for organic material for our fertilizers. Lead, arsenic, nicotine are all poisons and every one of them is used in sprays on vegetables and fruits. DDT, and weed-killing chemicals are sprayed from planes on our fields. Agene produces fits in dogs and is used as a whitener in our flour. The preservatives that are used in canned and bottled foods are poisons. Our drinking water is doused with chemicals, the fluoride ion being the latest addition.

Food, water, air keep us alive. We die promptly without air, more slowly without water, and can keep going a while longer without food. One need be no Nobel prize-winning biologist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to recognize that all living tissue needs these three ingredients in a reasonably pure form if tissues are to be built and restored. Modern nutritionists tell us that mineral trace elements are as necessary in our diet as proteins and vitamins. What they do not emphasize is that noxious mineral and toxic chemical elements *may poison us slowly*. If a person becomes violently ill and dies suddenly after eating, for example, an apple that had been sprayed with lead arsenate, we would say that there might have been some causal relationship, or perhaps an exaggerated sensitivity, on the part of the deceased. When some people died and many were made sick by inhaling smog-bound industrial fumes in Western Pennsylvania a few years ago, we had no hesitancy in seeking a relationship between the noxious fumes and the morbidity and mortality.

When we are being *slowly* poisoned to death it is harder to see the connection between the poisons in our food, water, and air. That which is not immediate, specific, and promptly demonstrable requires imagination and research enterprise to prove the cause-and-effect relationship.

Turning now to the three areas of medicine that are now entirely unknown—the degenerative, malignant, and virus diseases—we may hint that these forms of disease might be in part produced, or aggravated, by the poisons that have been deliberately placed by man in our foods, water, and air. Although I know not a thing about the equations of the medical statisticians who chart morbidity and mortality rates, I have some impressions of my own that come from clinical observations. I could not write a scientifically acceptable paper on the subject with suitable graphs, charts, and tables because much of what I *think* I see comes from that unacceptable stratum, intuition, or subobjective impressions.

My first impression, an experience that I could not dignify by the qualifying work "clinical," is that too many young adults nowadays seem to have grave pathologic conditions. When young people under thirty have peptic ulcers, coronary disease, malignant hypertension, and cancer, we have a condition that gives us alarm. I know at first hand young people under thirty in each of these disease categories. One may discount my impression by saying that the incidence of these diseases is the same as it always has been but that present-day superior diagnostic methods make the conditions discoverable earlier. That I doubt. As I think back thirty-five years when I first began to have some interest in biologic subjects, I do not recall that young people were then dropping dead of heart attacks or cerebral accidents, were on ulcer diets, or were dying of cancer. In my own youth the young people who died of disease died of diphtheria, tuberculosis, pneumonia, and other forms of infection. They did not die in appreciable numbers of the degenerative, malignant, or virus diseases, such as poliomyelitis.

My second impression is that the blood dyscrasias—the leukemias and anemias—are more common today. It could be that superior hemotologic diagnostic methods play a role here.

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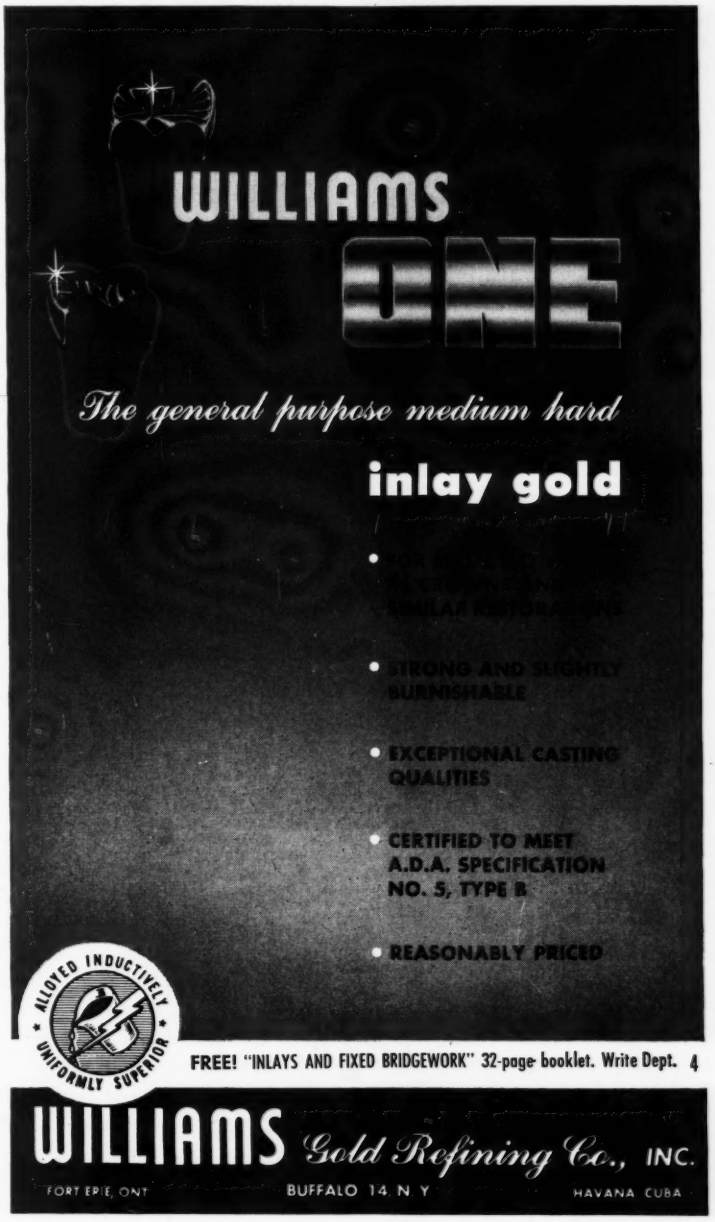
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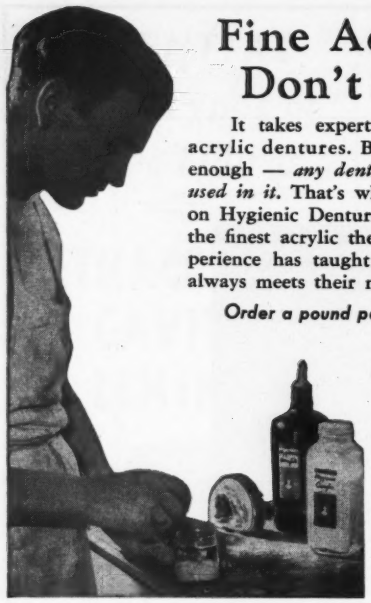

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"Recent experience with chloromycetin is an impressive reminder that highly potent drugs must be treated with extreme care and should not be employed unless there is a clear-cut indication that they are needed. *There is no way of foreseeing as yet all possible reactions which may develop in patients after a drug becomes widely used.*" Let the fanatic fluoride exponents give that some additional thought!

My third impression is that the degenerative diseases are increasingly more common. Anyone arguing against this point of view will immediately say that this is natural because people now live longer than they did in other times because of the conquest of the childhood and infectious diseases. Thus more people are around to experience the degenerative processes. There is validity in this argument. But despite the validity in the argument, I see people in the young age brackets who are showing signs of degeneration, particularly in psychiatric diseases. I am well conscious of my audacity and my utter lack of scientific qualifications to suggest that there may be a relationship between mental and nervous diseases and the poisons from foods, water, and air. But let me state my case.

Arteriosclerotic changes are classified as degenerative. Frequently with arteriosclerotic degeneration the personality undergoes a transformation. Senile dementia or "childishness," as the condition is aptly described by the unlettered, is a common occurrence. When tissue degenerates it does so because the cells undergo a chemical change due to lack of adequate food, water, and oxygen for cellular metabolism. In the

arteriosclerotic not enough sustenance is getting through to highly developed nerve tissue because of blockage of the blood vessels. The blockade produces cellular starvation. It is entirely conceivable to me, from the point of view of biochemistry, that highly specialized brain tissue in young persons undergoes degenerative changes because of the noxious chemicals carried in abundance to nerve cells by an adequate blood supply. In other words, you can degenerate because you do not have enough blood or you can degenerate because you have enough blood carrying the wrong things. Therefore, whether the brain cells are destroyed by inadequate blood supply as in arteriosclerosis, or by toxic chemicals that are carried in an abundant supply, the result is the same—personality change or a psychosis. The arteriosclerotic with senile dementia is usually in the past-fifty age group, the violent schizoids and paranoids are usually in the under-fifty age group.

My admiration for animal experimentation is profound. Without rats, guinea pigs, dogs, and monkeys, research would be disastrously hampered. But these laboratory animals are not human beings. Human beings have a memory of the past and a projection of thought into the future. They can look back and they can look ahead. Animals can do neither. The degenerative, malignant, and virus diseases may be demonstrated in laboratory animals but the processes are not precisely the same as they are in man *because man is not an animal.* Nor do the laboratory animals eat and drink the things that man puts into himself. Can you picture an animal drinking blended whiskey, or eating sauerkraut?

The case that I have presented against the poisons that we eat, drink, and breathe is not a scientific one. Abler men than I must follow through. When such experiments and observations are made we may find that our prideful chemical and atomic age produced the Frankensteins that destroyed us.—E. J. R.

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Do you ever feel, after a difficult or prolonged dental procedure, that perhaps the expert could have completed the work more efficiently?

Doctor A. Randall Ruskin had often entertained such self-doubt until he had an opportunity to watch one of the experts in action. Then he discovered that even the most skilled practitioner encounters delays and difficulties. The experience was heartening to Doctor Ruskin. Perhaps his article will give your own drooping spirits a lift.

★ ★ ★

"He installed a time clock which he punched as the patients sat down and again when they left," writes Doctor Edward L. Wharton, in describing "The Dentist Who Became a Stomatologist." Fortunately, this short-sighted, selfish dentist is a fictitious practitioner—we hope. He could be a real threat to the reputation of the whole profession, and his manner of working—and charging—might hasten the day of government-controlled health care.

★ ★ ★

Are you a dental society officer or committee chairman? If you are, be sure to read Doctor Herbert G. Frankel's article, "What Is Happening to Dental Societies?" Facts and figures show that the dentist is not always to blame for his lack of interest in local society programs.

Patients with good credit can pay their dental bills promptly—in Pittsburgh. In 1937, a bureau was organized to handle collections and other economic phases of practice for members of both the dental and the medical societies in the district.

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"Like so many innovations in our day, suing for malpractice has become a sporting proposition for which patients may be counted upon to seek openings," says Renzo Dee Bowers, Member of Bar, U.S. Supreme Court. He warns dentists that their danger is very real by reviewing some recent disastrous decisions.

★ ★ ★

Dentistry occasionally breaks into the Congressional Record. Most recent instance occurred when Doctor Lester C. Hunt, U. S. Senator from Wyoming, paid high tribute to Doctor Bion R. East for his fine work as Assistant Chief Medical Director for Dental Service of the Veterans Administration. The profession has reason to be proud of both Doctor Hunt and Doctor East.

★ ★ ★

"Agreements Not to Compete" can be held legally binding or can be ruled "unreasonable" by the courts. It all depends on the circumstances and details of the agreement. Albert Woodruff Gray's article explains some of these rulings.

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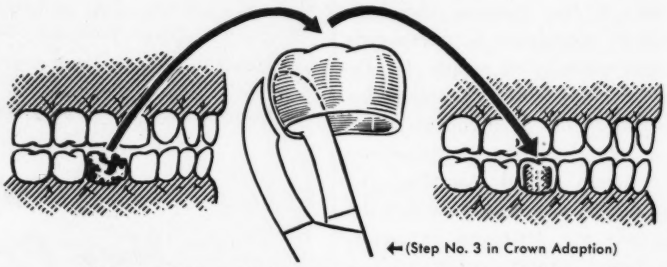

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COLUMBUS 6, OHIO

Please send information concerning Steel's Trupontics.

Dr._____

Address_____

City_____

See page 460 D.D.10

TICONIUM
413 N. PEARL ST., ALBANY 1, N.Y.

Please send name of the Ticonium Laboratory nearest to me.

Dr._____

Address_____

City_____

See page 461 D.D.10

RELIANCE DENTAL MFG. CO.
22 E. VAN BUREN ST., CHICAGO 5, ILL.

Please send information concerning DuraCement.

Dr._____

Address_____

City_____